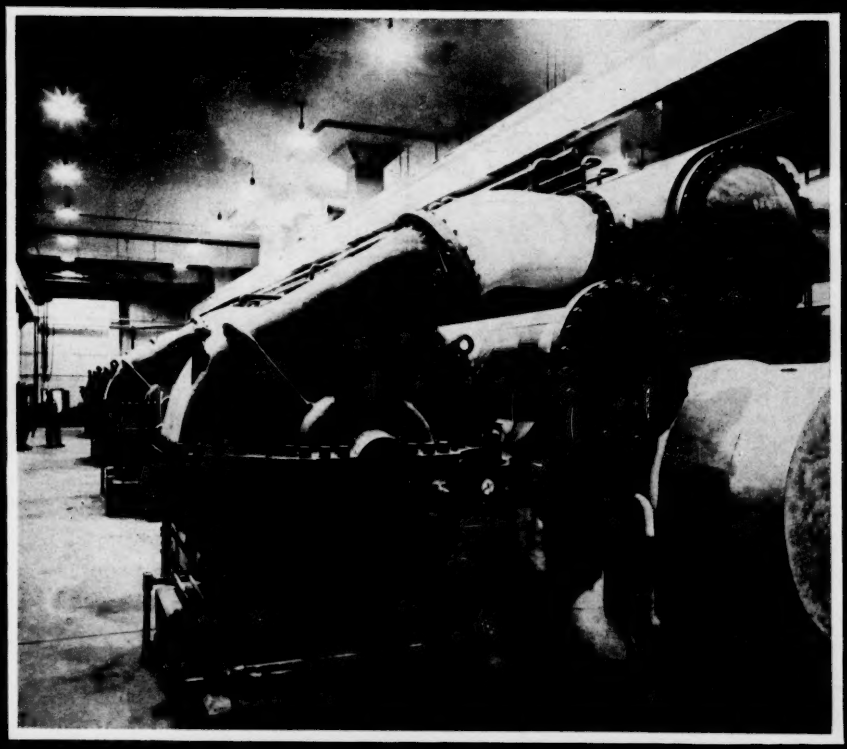
ICE and REFRIGERATION

THE NA
INDUSTR



Number of Ice and Refrigerated Warehousing...Pages 19 and 45

JANUARY • 1952

Selling Ice for Fresh Meat Is Mechanical Cools... Page 28

With ANY Compressor
... at ANY temperature

...MORE EFFICIENT REFRIGERATION

...when you use the New and Improved TEXACO CAPELLA OIL (WAXFREE)

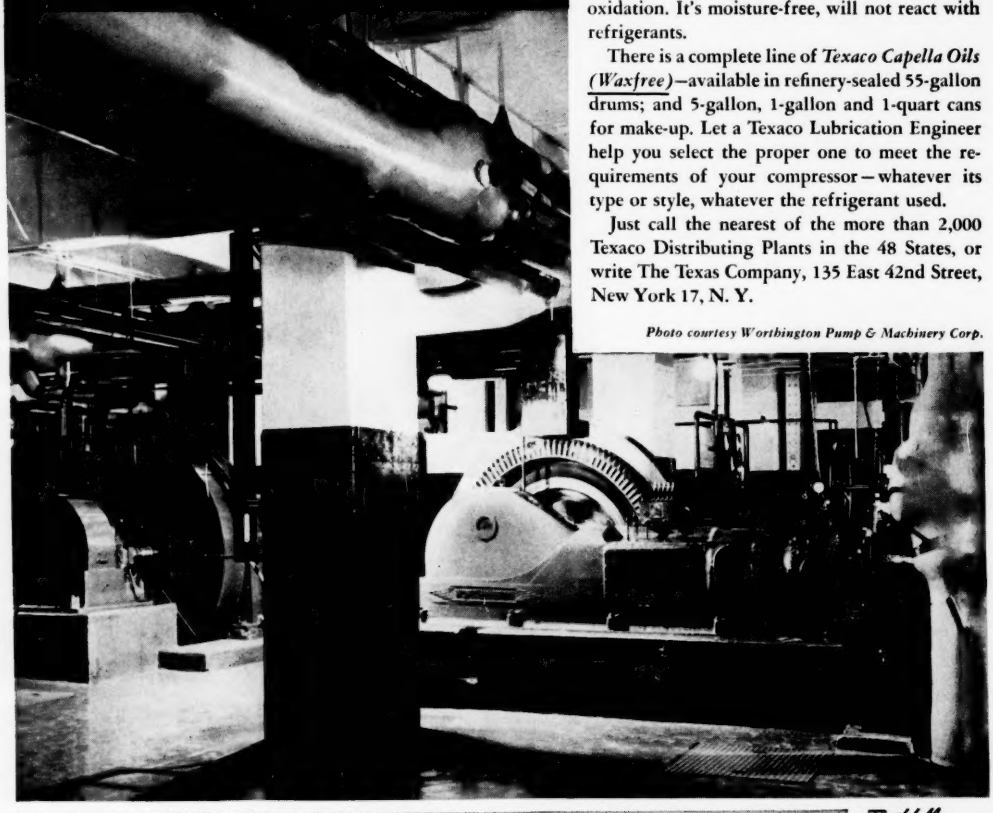
Throughout the refrigerating range — from normal refrigerating temperatures all the way down to minus 100° F. — the new and improved *Texaco Capella Oil (Waxfree)* assures greater refrigerating efficiency because it assures clean compressor operation and freedom from wax precipitation. Thus, compressor efficiency goes up, maintenance costs go down.

In comparison tests with leading competitive oils, *Texaco Capella Oil (Waxfree) exceeded them all in low haze and floc temperatures.* In addition, *Texaco Capella Oil (Waxfree)* has a very low pour point, a very high resistance to oxidation. It's moisture-free, will not react with refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)*—available in refinery-sealed 55-gallon drums; and 5-gallon, 1-gallon and 1-quart cans for make-up. Let a Texaco Lubrication Engineer help you select the proper one to meet the requirements of your compressor—whatever its type or style, whatever the refrigerant used.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Photo courtesy Worthington Pump & Machinery Corp.



TEXACO Capella Oils (Waxfree)
FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

Faithfully yours
50
for Fifty Years

TUNE IN . . . TEXACO STAR THEATER starring **MILTON BERLE** on television every Tuesday night. **METROPOLITAN OPERA** broadcasts every Saturday afternoon.

new "X-TYPE" doors

MOST REVOLUTIONARY ADVANCEMENT IN THE COLD STORAGE DOOR INDUSTRY!

Advantages of "Butcher Boy" NEW "X-TYPE" Construction:

1. "X-Type" Steel Diagonal Bracing is the basic principal of RIGIDITY.
2. Guarantees MAXIMUM INSULATION FILL inside of door.
3. The only POSITIVE method to prevent door sagging.
4. Allows REVERSAL OF DOOR SWING if necessary.

The Strongest and Most Durable Cold Storage Door Built!

No other cold storage door company can offer the exclusive features of "X-Type" Steel Bracing and "Interlok" No-Sag door construction . . . Specify these features . . . They cost no more.

Outside Corner Construction

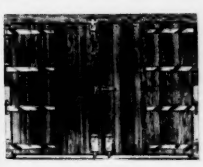
Inside Corner Construction

"INTERLOK" NO-SAG CORNER CONSTRUCTION *(Pat. Pend.)*

ALL BUTCHER BOY DOORS ARE BUILT "X-TYPE"

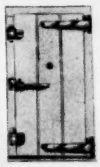
Plywood Door

Track Door



Double Door

Vestibule Door



Low Temp. Door

BUTCHER BOY COLD STORAGE DOOR CO.

170-180 N. SANGAMON ST. ★ CHICAGO 7, ILL. U. S. A.

Write Today for New Catalog

Butcher Boy Cold Storage Door Co.
170 N. Sangamon St., Chicago 7, Ill.

Please send me your new catalog on Butcher Boy "X-Type" doors

Name_____

Address_____

City_____ State_____

these cooling coils are BYERS WROUGHT IRON PIPE

Continuing the long-standing company policy of building for minimum maintenance and maximum durability, engineers of the Freedom-Valvoline Oil Company, Freedom, Pa., specified genuine wrought iron pipe for the refinery chilling coils. This sound specification is supported by company records of similar genuine wrought iron pipe installations in the plant which have served continuously for 20 years without replacement.

The new coils, fabricated from 2" extra heavy Byers Wrought Iron pipe, carry a brine solution for cooling the oil in the chilling tanks. Processing of the cold oil removes the wax.

Genuine wrought iron has been favored for condenser service for decades, and users report some remarkable service records. In many instances, other piping or tubing materials had also been used, giving a direct comparison of service under identical conditions, and genuine wrought iron was usually reported as lasting two or three times as long.

If you are using low-first-cost material in your condensers and are bothered by frequent repairs, you may find a source of substantial savings by using genuine wrought iron. Its widespread use as a "maintenance-stop" in this highly corrosive service confirms its ability to stay on the job longer at lower cost per year.

Our booklet, THE ABC's OF WROUGHT IRON, tells the how, why, where of this time tested material. We'll be glad to send you a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N. Y.

Why Genuine Wrought Iron Lasts

This notch-fracture test specimen illustrates the unique fibrous structure of genuine wrought iron—which is responsible for the high corrosion resistance of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

ICE and Refrigeration

VOLUME 122 NUMBER 1

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January 1952

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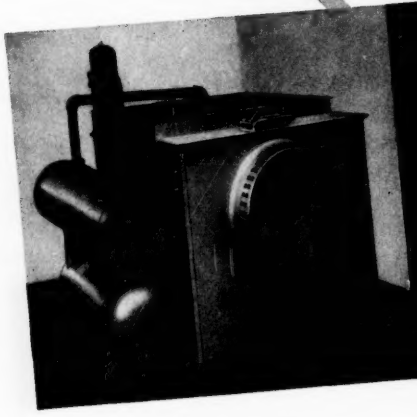
New

SAVES WATER and CUTS MAINTENANCE COSTS . . .

Illustrations show two views of a 35 ton Condenser Tower prior to partial disassembly for shipment.



Vogt

CONDENSER TOWER

FOR CONDENSING REFRIGERANTS

SINGLE RESPONSIBILITY:

Vogt, leading builder of refrigeration condensers, assumes responsibility for engineering the unit. Only one purchase order needed.

SHOP FITTED:

To cut down field assembly labor. Requires no cutting or fitting of pipe.

Designed for today's water conservation requirements, and to keep refrigeration costs low, the *new* Vogt Condenser Tower meets the need for a proven, readily cleanable condensing unit.

The Vogt Condenser Tower consists of a multipass straight tube condenser, a receiver, an oil trap, a cooling tower, and a water pump. Removable cast iron heads permit easy cleaning of the condenser tubes.

Water costs are extremely low since the cooling water is recirculated continuously and requires only a small amount of makeup to replace losses due to windage and evaporation.

Condenser Tower units are available in capacities ranging from 5 to 50 tons refrigeration. Additional information will be furnished upon request.

HENRY VOGT MACHINE CO., Louisville 10, Kentucky

BRANCH OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS, CHARLESTON, W. VA.

What's new? . . .

in Ammonia Refrigeration

Plenty. For one thing, there's Carrier's new line of reciprocating compressors, designed for new performance and new compactness.

Just pick your capacity — anything from 5 to 200 hp., and Carrier can fill it with . . .

. . . a compressor that'll give high efficiency and low operating costs. Because it's got extra-large gas passages, valves and ports; because of its water-cooled cylinder heads, oil cooling system, and low friction losses.

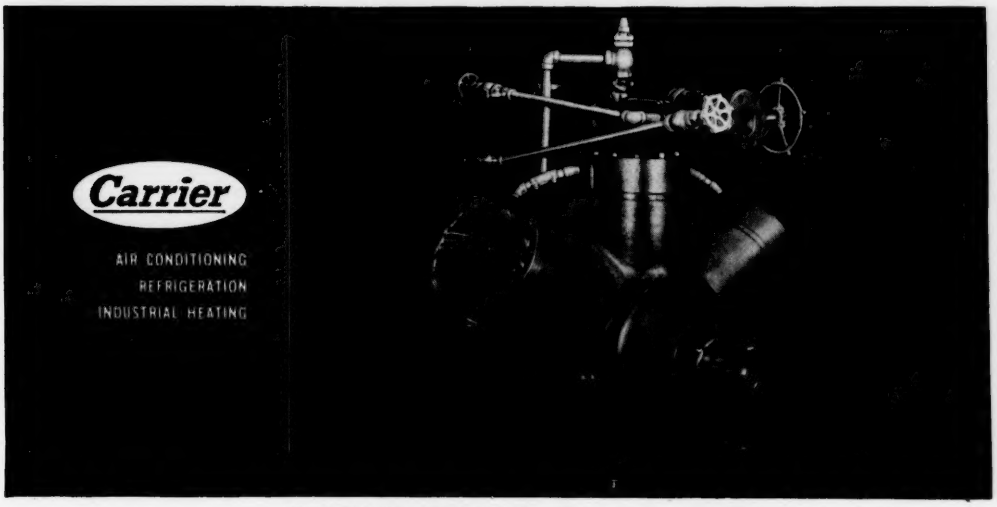
. . . a compressor that's so compact and free from vibration you can install it on upper floors, almost anywhere so as to be near the operating load.

. . . a compressor that can do the job of several smaller compressors because it's built to give high partial load efficiency.

It's natural that the news in ammonia refrigeration comes from Carrier, because Carrier was in the business more than fifty years ago. And they're in it today, with a complete line of reciprocating compressors, centrifugal compressors, ammonia condensing systems, evaporative condensers, and cold diffusers.

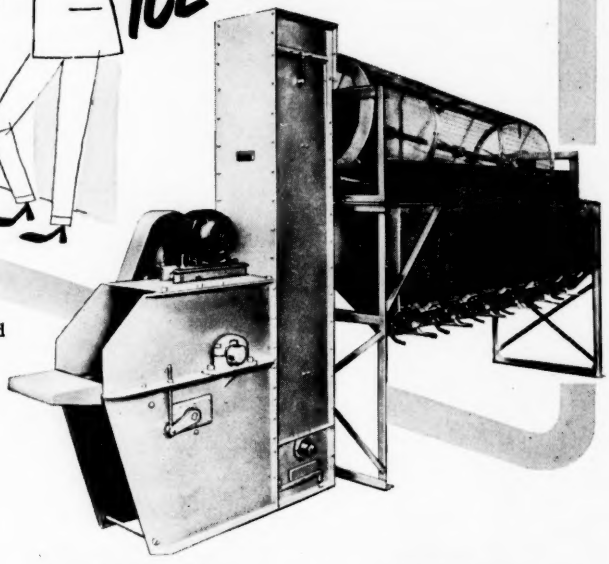
All of them the result of Carrier's long experience and engineering knowledge. All designed and built around your refrigeration needs.

So write us for more information. We can promise you the best ammonia refrigeration on the market. Carrier Corporation, Syracuse 1, New York.



Carrier 5J Reciprocating Ammonia Compressor. One of a line of seven, capacities from 5 to 100 tons. Also ammonia condensing systems using Centrifugal Refrigerating Machines in capacities from 100 to 1200 tons, Ammonia Cold Diffusers and a complete line of Evaporative Condensers.

right to size . . .
G-W
ICE SIZING UNITS



In elevator height, in bin capacity, in dimensional requirements, there's a Gifford-Wood Series S-16 Unit that's right to size for your ice plant operation. These G-W S-16 ice sizers are tailor-made in four models to deliver the maximum in saleable ice from every cake processed. And backed by 138 years' experience in the industry they give better all-round results because they're better engineered in...

BREAKER CONSTRUCTION • **ELEVATOR PERFORMANCE** • **SCREENING AREA**

Correctly pitched, curved picks work cake at right angles for efficient, controlled slicing action.

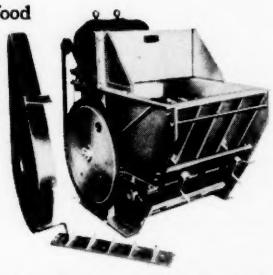
Steady, consistent flow of ice particles to screen with minimum waste is insured by closely spaced, continuous flights.

Screens are rotary in design, ample in area to guarantee a clean, uniform product.

Sound engineering design of these three essentials, plus careful planning and rugged construction of every detail make the Gifford-Wood Series S-16 Sizers made-to-order for you. Write for Bulletin 482.

AND REMEMBER, TOO,

. . . there's a Gifford-Wood Ice Breaker built to fit your particular need – from models delivering 50 tons per hour, down to manually operated models. All are built for heavy, continuous service and trouble-free operation. Write for Bulletin 482.



Model 480-MD Heavy Duty Ice Breaker is built for the roughest service with a capacity of up to 50 tons per hour.

GIFFORD-WOOD CO.

NEW YORK 17 *Since 1814* CHICAGO 6

420 Lexington Avenue HUDSON, N. Y. 565 W. Washington St.

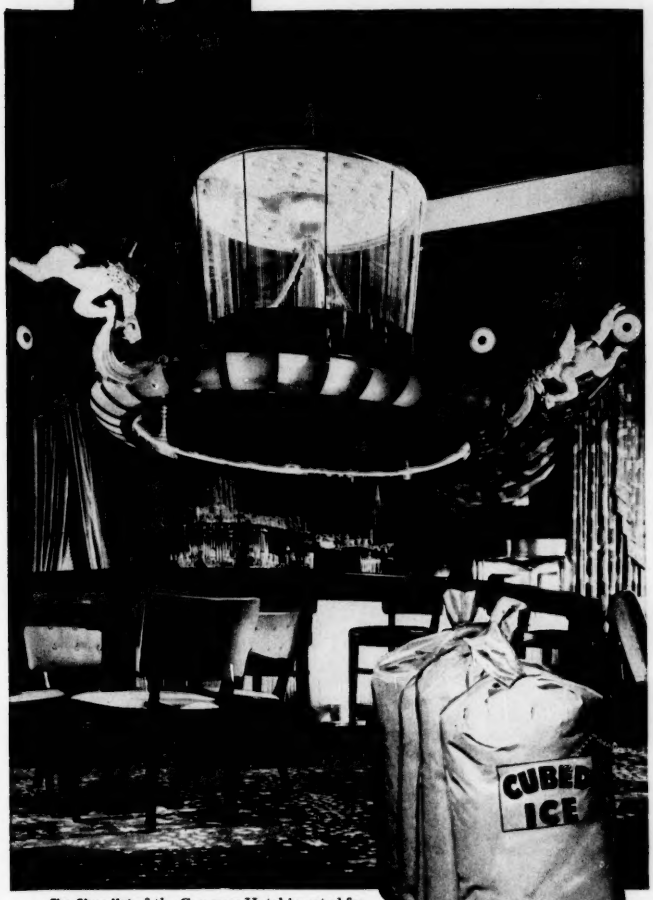
Pacific Coast Representative: Western Ice Equipment Company, 420 Market St., San Francisco 11

Cuber Breaker-Elevator Tiering Machine Conveyor

9277

"For a fine hotel, Packaged Processed Ice is a sanitary necessity"

says Nino Bignami, Director Food & Beverage, Congress Hotel, Chicago Illinois



The Glass Hat of the Congress Hotel is noted for its glamour and gaiety on Chicago's famous Michigan Boulevard.

Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet...thanks to a water repellent resin that binds the fibres of the paper firmly together.

The Extra Service That Makes the Sale

SMART BARS and eating places can't take chances with processed ice. It must be 100% free of contamination, dirt, foreign particles. That's why so many of them today insist on processed ice packaged in Union Paper Ice Bags. The wire tie locks out dirt, bars spillage or pilferage.

The Union one-trip Paper Ice Bag cuts your costs, too. The sturdy wet-strength paper—two layers thick—retards melting. Handling is speeded up—at the ice processor, loading dock, delivery point.

You'll find, too, that customers use more ice; it is so easy for them to ice from the handy paper bag.

Month after month more ice companies build new business with the Union Paper Ice Bag. Join the parade. Write for free samples today.

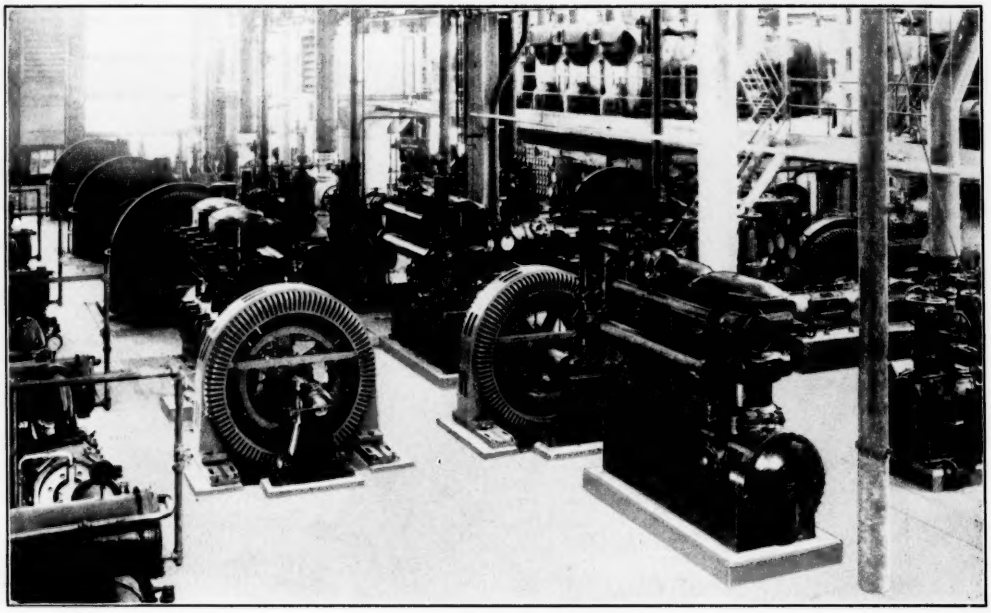
ONE TRIP

TRADE MARK UNION

UNION Paper Ice Bags

A product of the **UNION BAG & PAPER CORPORATION** • **233 Broadway, New York 7, N. Y.**

Bags of Kraft, Transparent Films, Waxed Paper, Classine, Laminates



Celanese Corp. Uses 6420 Horsepower of Frick Refrigeration

Fourteen Frick refrigerating machines are in operation at the Amcelle plant of Celanese Corporation of America, near Cumberland, Md., makers of chemical yarns. Most of these ammonia compressors have been in use since 1929. The motors driving the new vertical machines, shown in the foreground, are each of 1250 horsepower.

This is a large-scale example of the dependability and economy of Frick ammonia refrigeration. Power requirements, when operating in summer weather on air conditioning loads, are only 0.70hp. per ton of refrigeration.

The really important jobs, whether for air conditioning, ice making, or other commercial cooling work, call for FRICK refrigeration.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery

improve your crushed ice service . . .

AND SELL MORE ICE

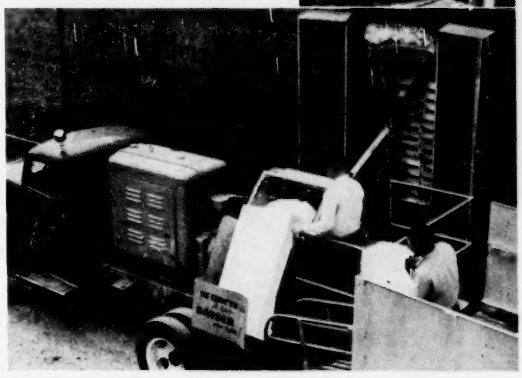
Open New Sources of Profit
In the Perishable Food Field

Equip your plant to offer crushed ice service to shippers of perishable products. Conveyco ice crushers, crusher-blowers and portable crusher-blowers open new opportunities for selling more ice. Top icing trucks and railroad cars loaded with produce and other perishables is profitable business. If you're not located near a truck depot or railroad siding, Conveyco's portable truck-mounted crusher-blower will permit you to offer crushed ice service at the customer's location. Vegetable markets, milk trucks, shippers of fruits and vegetables, plus many other local customers need crushed ice to protect their merchandise. Take advantage of this lucrative market now with profit-making Conveyco ice crushing and ice conveying equipment.

You can get complete information by filling in the coupon below and mailing today! Get in on these extra profits now!

Icing carloads of produce offers extra profits. Reefer trucks also present an additional market for ice.

Truck mounted Crusher-Blower icing a car.



ENGINEERS • MANUFACTURERS

THE CONVEYOR CO.

3260 EAST SLAUSON AVENUE
LOS ANGELES 58, CALIFORNIA

THE CONVEYOR CO. IR 1
3260 East Slauson Ave., Los Angeles, California

CONVEYCO

Please send complete details on Ice Crushing and Conveying Equipment.

Name_____ Title_____

Company_____ Address_____

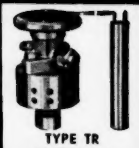
City_____ State_____

THERMO EXPANSION VALVES

TYPE 402 with pressure limiting feature

TYPE TK "3 valves in 1"

TYPE TCL



TYPE TR Multi-Outlet

For automatic control of liquid refrigerant on all types of refrigeration and air conditioning systems. Capacities: from fractional tonnage to 50 tons "Freon-12", 100 tons Methyl Chloride. Low temperature valves for −40° F. to −100° F.

SOLENOID VALVES

TYPE S1

TYPE S2

TYPE M3

TYPE R2

For all types of service. For liquid: "Freon"—up to 75 tons. Methyl Chloride—up to 150 tons. For suction: "Freon"—up to 8.8 tons. Methyl Chloride—up to 17 tons. For brine, water, gas, air and steam.

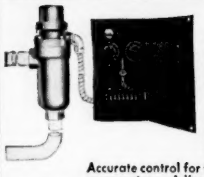
FLOAT VALVES AND SWITCHES

TYPE HK high pressure float valve

Up to 5 tons "Freon-12", 10 tons Methyl Chloride and 20 tons Ammonia.

TYPE J5 electric float switch

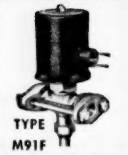
For "Freon", Methyl Chloride, Ammonia and other non-corrosive liquids having a specific gravity of .6 or more. Up to 460 volts AC and 250 volts DC.



908 LECTRO-LEVEL electronic remote control of liquid level

Accurate control for full-flooded evaporators. Adjustable to a wide range of level changes. Easy-to-set control dials conveniently mounted in remote box. Successfully used for over 5 years.

AMMONIA CONTROLS

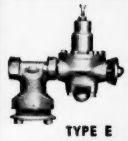


TYPE M91F

TYPE TG

TYPE UGZ

TYPE TX

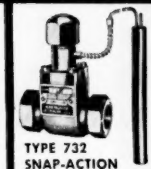


TYPE E with Strainer

SUCTION LINE CONTROLS

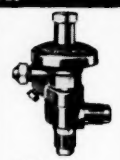
TYPE EPR

For all refrigerants with connection sizes up to 6"



TYPE 732 SNAP-ACTION SUCTION VALVE

Temperature operated —½ ton, "Freon-12"—1 ton, Methyl Chloride.



TYPE 760 "EVAPOTROL"

Pressure regulator—½ ton, "Freon-12"—¾ ton, Methyl Chloride.

Solenoid Liquid Valves — up to 172 tons. Solenoid Suction Valves — up to 28 tons. Thermo Expansion Valves—from fractional tonnage to 125 tons. Automatic Expansion Valves — from fractional tonnage to 60 tons.

ALCO VALVES

the COMPLETE LINE of refrigerant controls

For capacities in excess of those listed, write us for further details and give specific requirements.

ALCO ALSO MAKES: Constant Pressure Expansion Valves — Liquid and Suction Line Strainers.

AVAILABLE AT YOUR WHOLESALER'S

ALCO VALVE CO.

835 KINGSLAND AVE. • ST. LOUIS 5, MO.

In The Spotlight

A RAPID ICE freezing process has been developed at the Rapid Ice Freezing Ltd. plant in Hafia, Israel which freezes ice cakes in one-third to one-half the time required by usual commercial methods. For description and pictures see page 13.

A COLD STORAGE and freezer plant has been completed at Santa Clara, Calif., at a cost of approximately $400,000. Special attention was paid to floor layout and arrangement of rooms to facilitate mechanical handling of commodities. For description and pictures, see page 17.

THE ICE INDUSTRY during 1951 was a victim of an abnormally cool summer and there were other unfavorable factors which caused sales to drop below the previous year for the third year in succession. These and other conditions, including, happily, some favorable factors, as reflected by comments from leading ice producers, are reviewed as an annual feature of ICE AND REFRIGERATION starting on page 19.

REFRIGERATED WAREHOUSING had a good year in 1951, with increased occupancy for both coolers and freezers, and the outlook for 1952 is very favorable. One unwelcome aspect was rising costs, the result of which was decreased net revenues. These and other factors are set forth in an industry review, an annual feature of ICE AND REFRIGERATION starting on page 45.

AIR CONDITIONING design and operation involves the application of design rules and formulae as well as practical experience. A paper on this subject turns its attention primarily to important factors that govern proper operation of a system. See page 33.

COVER: The General Accounting Office Building, largest in Washington, D. C., is cooled by four 1000 hp York turbo compressors. They chill water at the rate of 12,000,000 gallons per day. Total circulation of conditioned air is 1,900,000 cu ft per minute. The building covers a solid block with no courts or wings for natural light and ventilation.

THE A.S.R.E. annual meeting held at New Orleans, La. December 2-5 presented an interesting program of technical discussions and papers with one session covering insulation materials and methods of applying. Report starts on page 41.

MEAT ON ICE offers a potential new market for crushed ice of nearly three million tons a year, according to a report from California. Tests made there show that astounding savings can be made on reducing shrinkage, spoilage and other losses. A complete survey of the subject is presented in the article on page 23.

THE PROGRAM of the National Association of Refrigerated Warehouses was discussed in detail and other business was transacted at a meeting of the executive committee held in Chicago, November 15 and 16. For report of the meeting see page 49.

COLD STORAGE HOLDINGS for November 30 showed a decrease of two percent over October 31 in public cooler space, while seasonal increases in freezer space raised the national level to 84 percent compared with 79 percent reported last year. The holdings of chief commodities stored each month during 1949, 1950 and 1951, also the 5-year average, are tabulated on page 53.

60 Years Ago

From the January, 1892 Issue of ICE AND REFRIGERATION

THE ICE MACHINE manufacturers all over the country were very busy with orders placed and in figuring on new plants. The construction season was then under way and the outlook was that a large number of new factories would be erected during the winter and spring. In fact, business at the machine shops was so universally active that it was safe advice to give to all who contemplate installing plants. Do not delay longer than is absolutely necessary in completing your arrangements and in placing orders for machinery and erection of plant.

IN THE NATURAL ice field it was reported that the heavy snowfall and cold weather of the middle of November and early part of December had been succeeded by mild weather and copious rains in the Northern states, which had done much to fill up the rivers shrunken by the summer and autumn drouth, so that the prospect of abundant water in the cutting field was better than a month previous. With cold, ice making weather after that date there seemed to be no reason to doubt the cut would be as large that year as ever.

THE NEWLY completed Soldiers' Home at Dayton, Ohio found it necessary to install refrigerating equipment to preserve the perishable supplies. For this purpose a building over 400 feet long was built at a cost of $75,000 and a 50-ton refrigerating machine made by W. P. Callahan & Sons was installed. This was a compression machine with two vertical single acting pumps and one horizontal engine with Corliss valve gear.

THE CITIZENS of Mobile, Ala., were enjoying the luxury of a "war" between the Mobile and the Consumers' ice companies and during the past month had been buying ice at 10 cents per hundred pounds. One company accused the other of cutting prices to secure the trade of the Armour Packing Company which uses large quantities of ice in its cooler. For that cut, retaliation was made and the underpinning of prices fell out to remain out "until both companies shall have wasted a good deal of money before coming to their senses again."

A PEORIA, Ill. newspaper records on its front page a news story about an ice wagon which broke down on Main Street and delayed the street cars.

Why has Schaefer's hand never lost its skill?

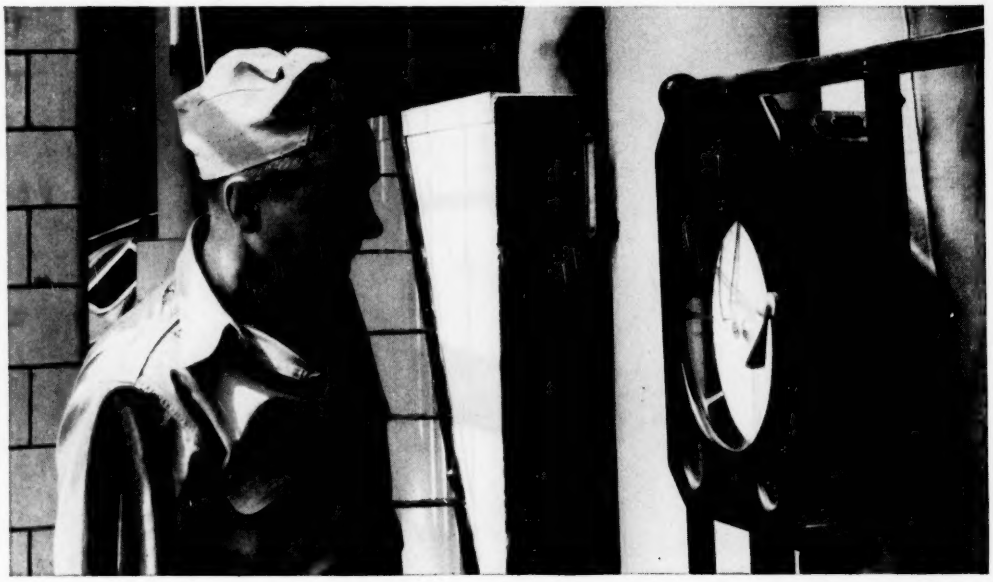
WHY has Schaefer Beer, sold only in the east, become one of the nation's best sellers? Largely because of close quality control in every step of their brewing process. The refrigeration system, shown below, is just one of the many places in the Schaefer plant where attention to details means Taylor control.

A FULSCOPE* Single Duty Pressure Recording Controller regulates the oil pressure of a turbine speed governor according to the back pressure of the ammonia section of a centrifugal compressor system which serves the processing and storage areas. Result: precisely controlled temperature, lower operating cost for the F & M Schaefer Brewing Company.

For complete information on Taylor's full line of accurate, dependable instruments for the refrigerating industry, ask your Taylor Field Engineer or write for Catalog 300. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

Taylor's Centennial ACCURACY FIRST SINCE 1851

*Reg. Trade-Mark



Taylor Instruments mean Accuracy first!

"RAPID ICE" FREEZING PROCESS

New commercial ice plant now operating in Haifa, Israel using rapid-freeze manufacturing process shows startling decrease in the time required to produce crystal clear block ice

EUGEN WILBUSHEWICH
Haifa General Ice Factory & Cold Storage Co.
Haifa, Israel

An interesting development of compact equipment to freeze ice was described in an earlier article in Ice and Refrigeration. While the ice is frozen in blocks the cans are fixed in place. After thawing the ice drops out the bottom. Subsequent work on the equipment has demonstrated that clear ice can be frozen if the water is recirculated by means of a pump. By adding a refrigerated drop leg down the center of the ice mold, the speed of freezing is more than doubled but the hole thus produced is small enough to be frozen up by the refrigeration in the block when it is harvested. The equipment is now in commercial use overseas.

IN August 1950, ICE AND REFRIGERATION the article headed "New Rapid-Ice Freezing System", reported on the work carried out at the experimental station of the Haifa General Ice & Cold Storage Co., Haifa, Israel, where equipment for more rapid freezing of ice has been under development for some years.

Meantime, various journals like "Modern Refrigeration" (December 1950) in an article headed "The Freezing Velocity of the New Rapid-Ice Producing Method", and also "La Revue Générale du Froid" (February 1951), have endeavored theoretically to explain the surprisingly rapid freezing time. It is about one-third to one-half of the freezing time calculated by using the formula previously employed.

Continued experiments with this rapid-ice manufacturing process using the direct expansion method, have now led to a commercial plant. This plant though mainly destined for commercial ice production, also allowed a series of further experiments. These resulted in certain inventions whereby an acceleration in the freezing rate could be achieved, which now is nearly three times more rapid than that reported in the articles published last year. Besides, it is now possible to freeze crystal-ice instead of the then produced opaque-ice.

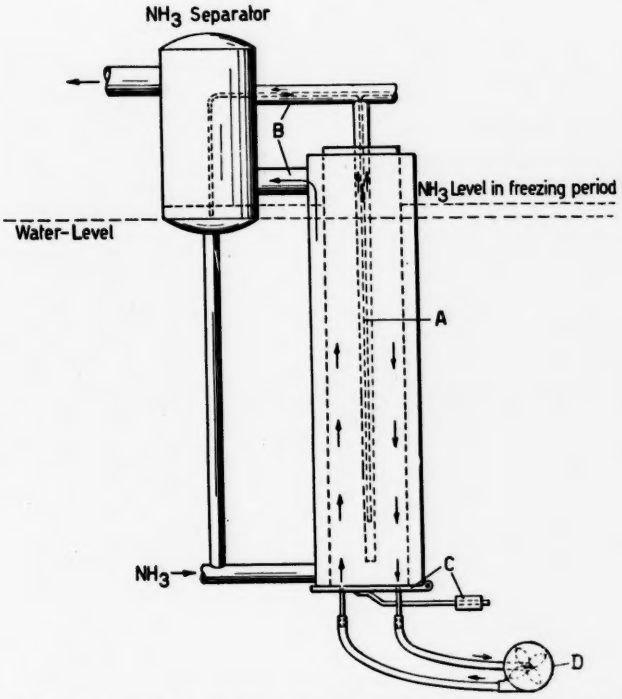


Fig. 1—Design of the rapid-ice freezing unit. The freezing mold is jacketed so that ammonia evaporates around it. Liquid is also fed to the center freezing tube through a small line and the vapor is released through the annular space (A). The lower lid (C) freezes in place around its outer edges. The water pump (D) recirculates the unfrozen water to keep the ice clear as it freezes.

Rapid-Ice Freezing Unit

Fig. 1 shows a rapid-ice freezing unit the ice molds of which have been equipped with a novel internal evaporator tube (A). This is an ordinary tapered tube, ¾ in. on top and ⅝ in. at the lower end, into which a ¼ in. tube leads supplying the liquid ammonia. For the evaporation of the ammonia, the tapered tube tees to the suction pipe (B), and this evaporator is arranged for automatic work, as well.

Another novelty has regard to the connecting pipes between the mold covers (C) which now allow water, pumped by means of a small pump (D) to circulate the inner walls of the ice molds and the immersed evaporator tube, resulting in a perfectly crystal-clear ice block.

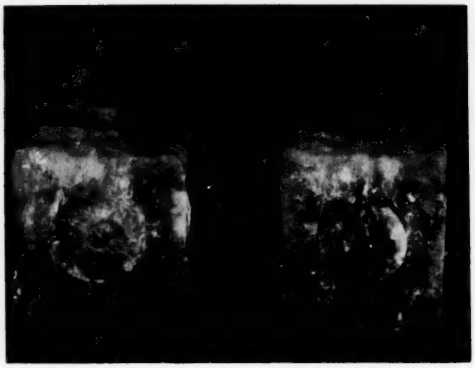


Fig. 2—Broken section across the ice block. The circular section indicates ice frozen around the center tube.

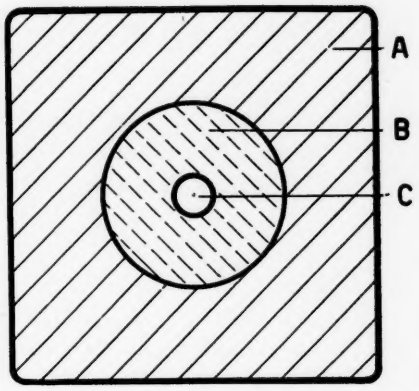


Fig. 3—Section through ice block indicating ice formations.

So far, the fabrication of a 25 kg ice block took 5 hours at normal evaporation temperature of 5 F (minus 15 C); now, less than 2 hours is required.

Fig. 2 shows a photograph of a break across the ice block.

The paper dealing with these new developments and phenomena had been submitted somewhat too late to the recent Eighth International Congress of Refrigeration held in London, to be dealt with and discussed at length. However, through the kindness of Dr. E. Griffiths, Chairman of the papers committee, it nevertheless was read in the Commission II on the last day of the Congress, by his assistant Mr. M. J. Hickman, though in an abridged version as owing to the amount of papers submitted not enough time was left, also for a thorough discussion, so stimulating in this instance, also for the scientists interested in crystal formation. For it is assumed that most probably a crystallization is being affected that obeys different laws of formation and conductivity than those governing the ice-crystal growth in the generator ice production with the aid of brine, where for large ice blocks, the known formula applies:

$$\text{Freezing time} = \frac{C \cdot d^2}{32 - t}$$

Fig. 3, giving a cross-sectional plan view through a mold, shows the "reach" of the evaporating ammonia when freezing the water both from the walls and the internal tube, the latter obviously constituting a ring as photographed in Fig. 2. Taking a standard 25 kg ice block, and a 18x18 cm square section, (A) the inner ice ring will have a 9 cm diameter, (B). With a 2 cm diameter of the inner tube, (C) and its approximate 6 cm circumference, about 61 cubic cm of ice is being formed. This represents a 1:10 ratio for the freezing effect of a unit height of the tube wall to its ice forming area. On the other hand, the side walls with their 4x18 cm=72 cm circumference will form an area of ice 18x18 cm=324 cubic cm less the said circular 61 cu. cm, leaving 263 cu cm; this represents an approximate 1:3½ ratio for the freezing effect of a unit height of the mold walls to its ice forming area. These differences apply with the ammonia kept at the same evaporation temperature, both in the outer wall

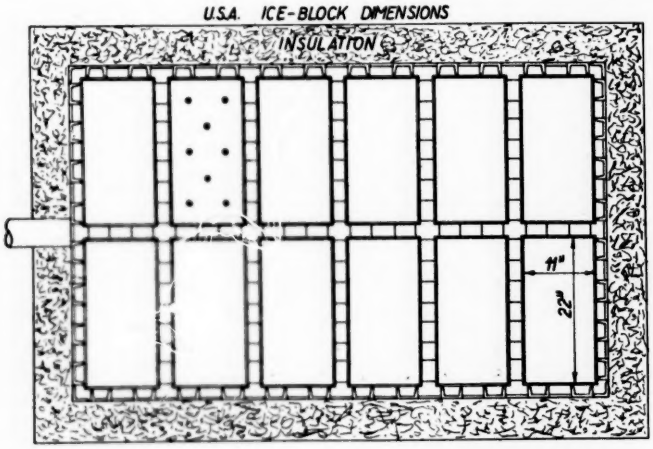


Fig. 4—Plan view of a rapid ice freezing tank with 12 cans 11 x 22 in. The dots in the second can, upper row indicate the position of the direct expansion pipes to speed freezing of the ice.

Fig. 5—Views in and around the Rapid Ice-Freezing plant in Haifa, Israel.

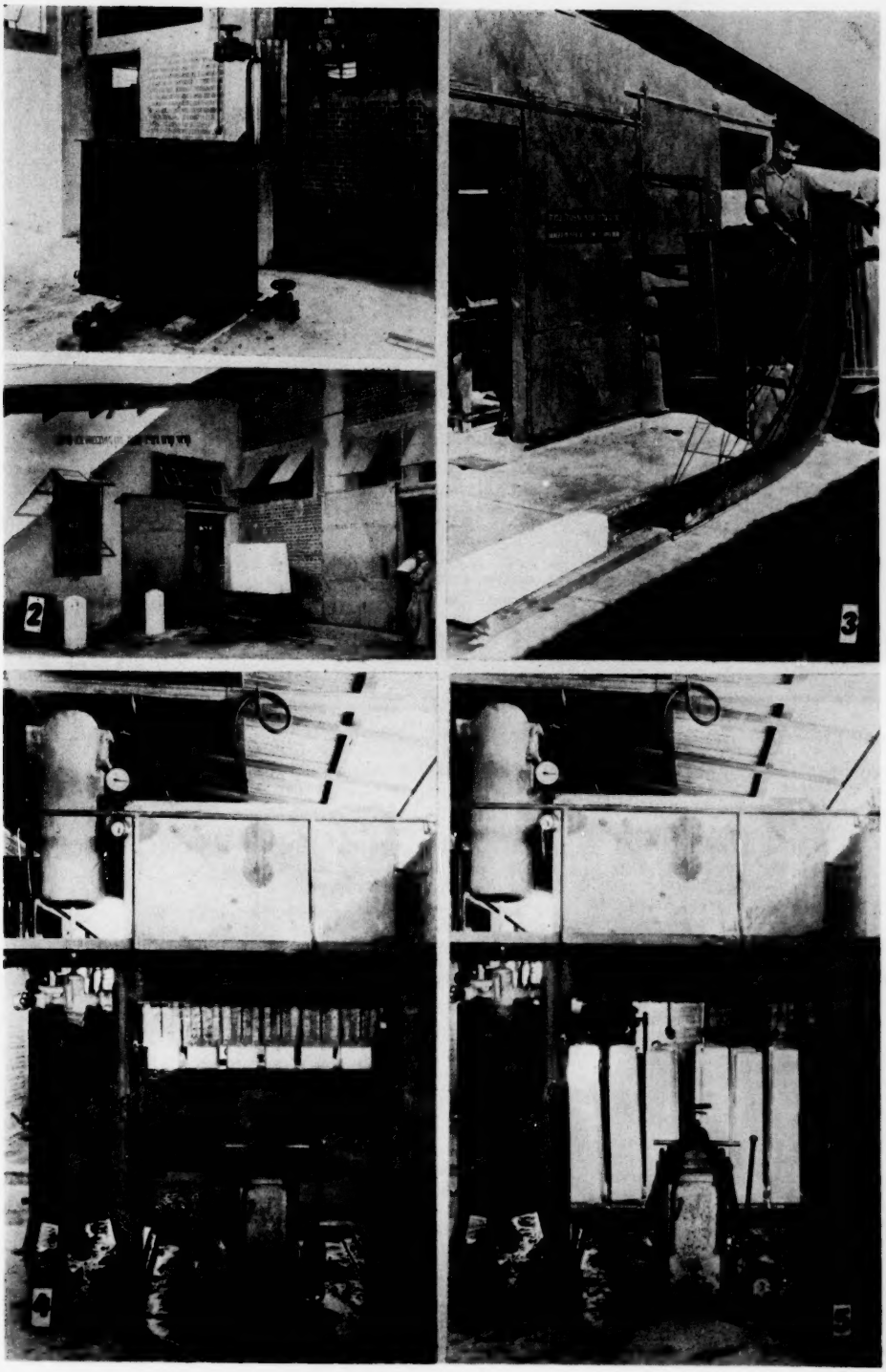
Top left—Set-up of a rapid-ice plant, extending conventional 50 ton ice plant.

2—Partial exterior view of Haifa ice plant showing ice blocks frozen by rapid freezing process.

3—Experimental chute designed to receive newly frozen ice blocks. In lower left, an ice block delivered from chute to platform.

4—Freezing battery in operation, ice blocks are dropping on an adjustable lowering table.

5—Here the blocks have dropped from the cans, ready for storage or immediate use.



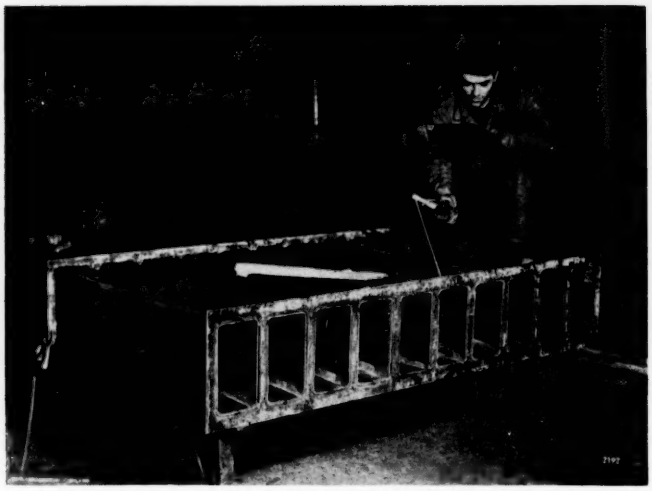


Fig. 6—A 10 can unit for rapid-ice freezing being fabricated in Italy for installation in ice manufacturing plant.

jacket and the internal tube, and circulated via the same compressor suction pipe.

How can this great difference in the ratios be explained? Obviously, around the tube a totally different crystal structure is apparent than along the side walls.

Re-fill Freezes Quickly

A further surprising discovery, of interest to every ice block producer, relates to the following: It is possible, on the release of the ice block from the mold, to fill up the hole which the internal evaporator tube had left with a jet of water, which will freeze up without requiring additional freezing means. This freezing will take place quite rapidly, so that a solid ice block can be sold which, besides, will have a marked resistance against thawing.

This can be explained as follows:

	Calories
In order to freeze 1 kg of water, say, of 15 C (59 F) to 0 C (32 F), one requires	15
Ice-formation, occurring roughly between 0 C (32 F) and minus ¼ C, requires	80
Further lowering the temperature from ¼ C to minus 12 C (10.4 F) requires	6
Total requirement	101

Now, the 2 cm hole in a 25 kg ice block, does not take up more than 200 cc of water. To freeze this amount approximately 21 Calories are consumed. These can be taken from the available 6 Calories per kg of ice, i.e. the 150 Calories in the 25 kg block, leaving a large margin for the rapid freezing of the 200 grams of water.

Ice blocks of standard manufacture will not allow this procedure, as here the ice quickly assumes a temperature of 0 C, when no further calories are avaliable for ice making. However, rapid-ice blocks of 25 kg, produced by the direct evaporation method of ammonia at —14 C, is harvested at —12 C and has then 6x25=150 Cal. available for this purpose. Also, rapid-ice has the pecularity that it takes a longer time to attain 0 C and to then begin to thaw, as compared to normal ice blocks produced by the generator method.

Similarly, ice blocks of the large American type, can easily and rapidly be manufactured when instead of the single internal evaporator tube a number of tubes are inserted corresponding to the dimensions in question; they too, will finally be frozen up to a complete crystal-ice block.

A 300 lb ice block of the 11½ inches x 22½ inches size is thus being produced in 3 hours.

Fig. 4 gives a cross sectional view of a battery for freezing such large blocks yielding a daily production of 12 tons at — 15 C (5 F), the evaporation temperature of ammonia. The total area, including insulation, is 7 ft 3 in x 4 ft 10 in.

Savings in Power Consumption

The statements under this heading in the August 1950 issue of ICE AND REFRIGERATION, forshadowed further data to be rendered after the plant had been in operation over a period of time. Thus, it can now be stated for sure that the following savings can be effected:

In small plants, about 30 percent; in larger plants, about 25 percent.

The photograph, Fig. 5, shows the set-up of a rapid-ice plant, extending a conventional ice plant of 50 ton capacity. The batteries are built for a daily capacity of 5 tons each. The size of one such battery is about 140 cm x 45 cm (4 ft 7 in x 1 ft 8 in), i.e. only as big as a bureau, representing a remarkable saving in space compared to systems using brine.

At present the Rapid-Ice Freezing Ltd. in Haifa is building a plant comprising 20 batteries, yielding a daily production of 100 tons. Some batteries have recently been put into operation.

Design of a Chute

The chutes which guide away the falling ice blocks after they had been thawed free from the molds, had caused frequent breakage of the blocks. Lately, a commercial design was evolved and built. Photograph (3) in Fig. 5 shows the actual construction of an experimental chute which has now been adopted. While a circular guide has proved to be unsuitable, the novel construction, principally, uses the parabolic chute curve.

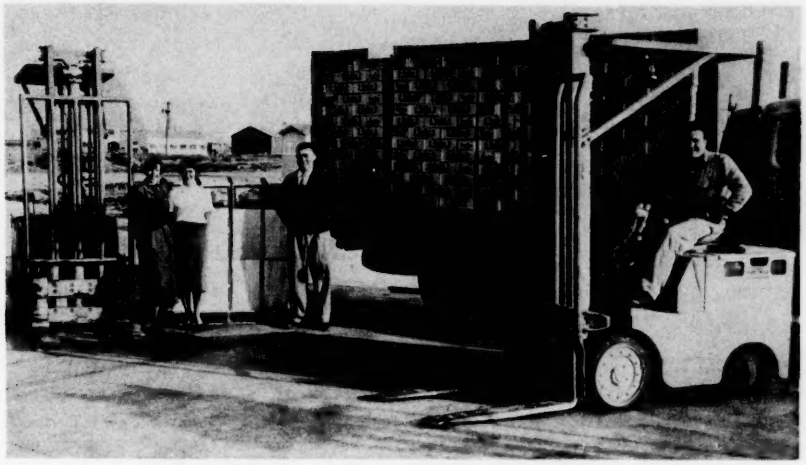
The bottom pictures (Fig. 5) shows a battery in operation. Here, an adjustable lowering table is being employed in place of a chute for removing the ice blocks, in order more readily to allow water to be poured into the holes that remain due to the internal evaporator tubes.

The discharged ice blocks can be transported by various means. They either fall onto a chute provided with castors, bodily to be rolled into the ice storage shed; or the blocks can drop onto a conveying system.

The development of rapid-ice was readily recoginzed in the countries of Southern Europe. Fig. 6 is a photograph depicting the building of a rapid-ice plant for a Milan combine. This plant is destined for the production of 35 kg ice blocks. It is being manufactured by Messrs. Ing. Guiseppi Dell 'Orto, of Milan, Italy.

Among ice manufacturers, the advantages of the rapid-ice plants are already being discussed, in order to determine whether a plant for the manufacture of small-ice pieces is also an economical proposition when not solely crushed-ice is required. The rapid-ice formation, combined with the possibility to guide the blocks direct into the crusher, the light weight of the freezer-battery,

(Continued on page 59)



Manager N. Kirkpatrick and some of the company personnel line up with two of the fork lift trucks and pallet loads of goods in the background. The truck in the background is fully loaded with 8 pallets. The pallet on the ground at left shows the loading pattern for boxed fruit. In the picture, left to right, are Mrs. Nancy Petersen, Miss Dorothy Paulsen, Mr. Kirkpatrick and Jack Williams.

NEW FREEZER AND STORAGE PLANT

In this modern plant special attention was paid to floor layout and arrangement of rooms to facilitate handling of commodities. Completed at cost of about $400,000.

A NEW storage and freezer plant has been completed at Santa Clara, Calif., by the Santa Clara Cold Storage & Freezer Co. at a cost of approximately $400,000. This is a modern plant, with special attention to floor layout and arrangement of rooms. Mechanical handling equipment is used wherever possible.

The plant is located on a tract of 11 acres in the Pasetta Industrial tract, and has railroad spur facilities for seven cars, and also ample platform space for trucks. The main building is 155 x 186 ft. Drainage is provided by seven lines of 4 in. agricultural tile placed in 24 in. ditches 3½ ft under the lowest foundation excavation and the ditch back-filled with drain rock. These seven drainage lines are tied into a 6 in. main drain line which empties in a 10 x 10 x 14 ft deep sump. The building is reinforced concrete outside walls with wood dividing walls. It is divided into six rooms 50 x 80 ft with a work lobby running through the middle entered by two main doors on each end. These doors, as are all the other main entrance rooms, are 9 ft high by 8 ft wide.

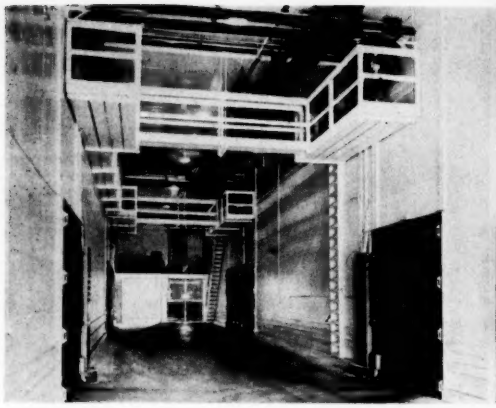
Storage Space

The usable storage space is 75,000 cu ft per room, the actual space being 90,000 cu ft. Each room will store 30 cars of grapes, figuring standard 1125 load and will store 25,000 field lugs of pears or approximately 704 tons gross weight. The work lobby being 20 ft wide allows ample room for fork truck operation. The large doors were decided upon for future use of storage racks. The self closing doors will be mechanized at a later date. A concrete loading area lies between the north wall and railroad track, this area is 60 x 186 ft. A similar area is on the south side, 50 x 186 ft.

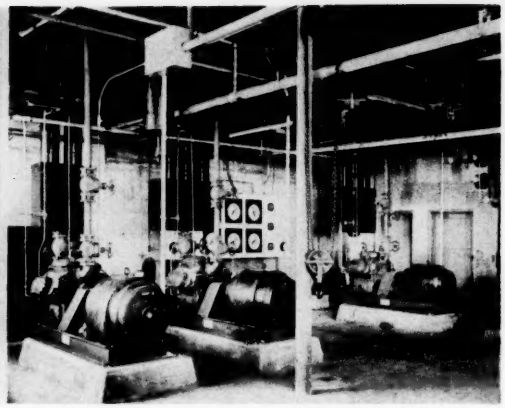
Jamison doors are being used throughout. The floor insulation consists of 12 in. of drain rock over which is spread approximately 2 in. compacted clay to seal against the loss of the rich concrete 4 in. slab, which was poured over this. Over the 4 in. slab a membrane was laid consisting of two, 15 lb hot-mopped felt sheets. Fourteen inches of Zonalite concrete was next applied. Over the concrete Zonalite, a 6 in. concrete working slab makes the finished floor. All outside walls are insulated with 6 in. Armstrong cork board. All dividing walls are insulated with 8 in. of Palco redwood bark fibre. Roof insulation consists of 12 in. of the Palco wool.

Air Circulation

Air circulation in the rooms is accomplished by twelve 1 hp General Electric motors driving 24 in., 4 blade propeller fans. Fin type 1¼ in. flooded coils are used in short evaporators. Seven 11 ft. banks of twenty coils each are installed, feeding into 12 in. heaters. All coils were galvanized after welding. The liquid level is controlled by Belmont electronic liquid controls. Hubbell air modulated back pressure regulators control room pressure and are actuated by Brown instruments located in the engine room.



The work lobby is 20 ft wide with two 9 x 8 ft entrance doors at either end. Note piping above with permanent platforms and runways for convenient, safe adjustment and maintenance.



Engine room view showing two 8 cylinder compressors, foreground, and 6 cylinder machine at right. In background at center is the control board with room temperature indicators and controls.

Four control stations are used for each room. Hot gas and water defrost can be used, but it has been found that the water defrost is necessary only when grapes are being stored. Two 8 cylinder and one 6 cylinder Vilter high speed compressors are installed. A Fuller A120 rotary booster is being used on the first unit of the sharp freeze. Two 33 A and one 31 A Recold evaporative condensers serve the compressors while a forced air circulation desuperheater is installed between the booster and the flash gas cooler. Fairbanks-Morse motors are used on the main drive of the compressors, two 100's, one 60, and one 75 hp. All control piping is placed above the work lobby. Access to this is by stairway. The only valves that are in the room are the control valves isolating the sensing element chamber. Dual suction headers are installed. All rooms are dual valved to each header.

Sharp Freezer

The sharp freezer floor is placed over 12 in. concrete pipe, placed on 24 in. centers with concrete sub-floor and 8 in. cork board insulation covered by 6 in. reinforced concrete slab. The air circulation is controlled by twelve 1 hp General Electric 4 blade 24 in. propeller fins. Approximately 135,000 ft of free air is handled per minute. This building is 50 x 80 ft. with 20 ft of one end used as a plenum chamber. Four cells are installed holding 38 pallets at each loading. Standard fruit pallets will be used, 44 x 48 in. in length.

Pears on Pallets

Packed pears will be stored on pallets 48 x 48 inches. These will be loaded with the Clark electric hand truck where a small amount is to be exchanged at one time. There is ample room for loading or unloading these cells with a standard 2½ ton 156 in. Clark lift truck. Three Clark 2½ ton lift trucks handle the complete pallet operation. Exid battery power is used. The area between freezer building and engine room building will be roofed over allowing the unloading or loading of three vans at one time.

Defense Official Studies Need for Refrigerated Space

REFRIGERATED storage plays an essential role in the defense effort, Defense Transport Administrator James K. Knudson said recently, and commended the warehousing industry on its progressive attitude in expanding facilities to meet the increasing production and use of food requiring refrigerated storage. Mr. Knudson said further:

"Modern freezing and storage facilities are now considered a necessity and are so recognized in our economy. The importance of the preservation of foods by freezing and storage in refrigerated warehouses until needed to meet the military or civilian requirements was conclusively demonstrated by our experiences in the last war and further confirmed by developments since that time."

Because adequate storage facilities cannot be improvised through utilization of existing industrial structures and many months are required for new construction, DTA, said Mr. Knudson, is now undertaking a study to determine the amount of additional space that will be needed to meet anticipated requirements of the Defense Mobilization Program. The results of this study will be publicized; and every effort will be made to induce the industry to construct by the use of private capital any additional facilities that may be required, thus avoiding the necessity for government construction.

Atchison Cooler Cave Reported Reactivated

THE refrigerated cave near Atchison, Kans. used by the Agriculture Department during and after World War II and which it was reported would be closed, has been taken over by another government agency, according to news reports. The other government agency has not been revealed, but it is stated that the cave's facilities will be used in connection with defense activities.

Previously it was reported that the project would be closed by the end of August and its storage space emptied of some 16,000,000 pounds of dried eggs which were to be sold to Great Britain.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE INDUSTRIES

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THIS MONTH IN BRIEF

The annual review of the ice industry for 1951 and of prospects for 1952 shows that ice tonnage was down but members look forward with optimism toward 1952 with hopes for increased tonnage for processed ice and new markets that are being opened through research.

The use of ice for mechanical meat cases promises a potential market for sized ice of nearly four million tons a year. Retail meat market men are interested and a convincing story is there, ready made for the ice man, as shown by research studies and studies in the field.

Important annual conventions of unit ice associations were held during the last month. These include the Delta States Ice Association and the Canadian Association of Ice Industries.

The Vegetable Growers of America saw a convincing display of corn icing at their annual convention. A new million dollar recreation center has been constructed at Huntington, W. Va., which includes an ice skating rink 180 by 80 feet.

Ice Industry Review Shows Trends—Total Sales Decline But Other Factors Favorable

REPORTS from leading ice producers representing a cross-section of the country are presented here as an annual feature of Ice and Refrigeration. As usual the situation is spotty, with both favorable and unfavorable conditions affecting the ice business during the summer of 1951.

The outstanding feature of these reports is that sales of ice were down from 1950; not so big a drop as was reported last year, but after three years of declining sales the added decreased tonnage was enough to be felt. The chief cause was an abnormally cool summer throughout the middle west and other sections, with increased sales of ice making machines a contributing factor.

Passing over this decline in sales of block ice, it is heartening to note that sales of processed ice, including sized, crushed, and cubes, did not follow this trend but more nearly held their own and in some cases, very happily, increased. Increased installations of vending machines added to this favorable pattern, particularly favoring processed ice, although many of them also vend small pieces of block ice.

Perhaps the greatest impetus to better sales in the future are the possibilities offered by the newly developed markets of poultry icing, meat on ice, and others. If the future of the ice industry rests, as some seem to think, on these new uses or markets, these reports indicate that there is basis for a hope for an upswing in future tonnage.

Viewing briefly the unfavorable factors, the cost of labor and other items of cost continue up, in spite of decreased revenues, which makes a tough problem for management. The only remedy seems to be to cut costs wherever possible without penalizing service and continuing some program to develop sales of more ice. Sales of refrigerators and other ice using appliances appear to be following the trend of ice sales—downward, although some appliance sales more nearly held their own, and may offer some hope for the future.

Returning briefly to more happy aspects, the outlook for 1952 is not wholly hopeless just as it is not unduly hopeful. Most distributors are looking forward to the next twelve months with confidence, and some expect business to improve.

It must be recognized that the ice industry is no different from other industries. In the words of a Texas executive, labor shortages, losses to competition, increased costs, adjustment to emergency regulations are certainly not exclusive headaches of the ice manager. While the flush earnings of the war years are definitely ended, there are many ice men the country over who are expecting to show earnings in 1952 that will be accepted as satisfactory.

Outlook for 1952

MEMBERS of the industry look forward to 1952 with mingled optimism and doubts, remembering four summers in succession of declining sales. The weather, as always, will be a big factor in determining whether sales will increase or decline. But there are other factors that will have their influence.

As one report says, a defeatest attitude can be counteracted by methods and "know-how" that have already proven successful. Gleaned from letters from leading ice men these comments could be used as basis of a business program for building a better ice business: Lose no opportunity to improve the service and keep the public informed. Some price relief should be obtained to offset rising costs. Expansion of supplemental lines of income. Elimination of wasteful practices now in effect at many ice plants.

The Ice Industry

From Washington, D. C., comes a prediction that the 1952 sales of ice will be about five percent less than they were in 1951.

A Canadian distributor, where domestic sales have held up much better than in the states says that on the whole they regard the future with confidence and believe that no opportunity should be lost to improve the service and keep the public informed.

From Kentucky comes word that they confidently expect their business to improve during the next 12 months as they expand certain supplemental lines designed to stabilize the income of the company, for with stabilized income will come not only renewed faith and courage to go out after new markets, but also the funds required to develop such markets. If we in the ice industry retain our faith in the ice business, he continuse, and if we back up our faith with works (i.e. aggressive ice merchandising) there is no question in our minds but that with proper adjustments, which many other industries have had to make in other years, the ice business in general can and will begin to move forward in 1952.

A New Mexico distributor says he hopes to do as well in 1952 as the past year. But he thinks that over the next few years we are in for a gradual decline in business, not only for the ice industry but for every one in business. The blame for this, he thinks, rests upon the inflated spending policy of the National government and he concludes that neither a government nor an individual can spend money like a drunken sailor and get away with it.

A New York State distributor thinks that with a normal summer season, sales will be about the same as 1951 in volume, but dollar value will be off again unless some relief can be obtained from the price freeze.

The operator of a North Carolina company says it is not his idea that there will be any more ice sold in 1952 than there was in 1951. However, in most areas, he believes the ice men can make as much money or more if they will work closer together and eliminate the wasteful practice that is now in effect at many ice plants.

A central Ohio manufacturer-distributor says nobody wants to wish mechanical refrigeration from the market, but should there be another war, ice sales may go up as they did in 1946.

A distributor in Washington State says the outlook would be considerably better with some relief from OPS. They have had no price increase since 1948 and increasing costs throw the price-cost picture out of line. With a slight increase in prices he believes they can hold their own.

In Texas industry leaders are viewing 1952 with confidence. Losses to mechanical refrigeration are and will continue to be serious, but industry experience has disclosed opportunities for compensating earnings.

Ice Tonnage is Down

SALES of ice during 1951 declined from the mark established in 1950 although the decrease was not as large as the previous year. According to the National Association of Ice Industries the average tonnage decline for the country as a whole was about 18 percent, compared with a decline of 21.6 percent the year before. These figures reflect that decline, although there were exceptions. A number of companies reported increases in tonnage, and increased prices in some instances brought the dollar volume up to at least partly offset the decrease in tonnage. Chief cause for decreased tonnage appears to have been the weather with other factors such as increased rural electrification, and competition from small ice machines.

From Washington, D. C., comes a report that ice sales were about 10 percent less than they were in 1950. This drop was mostly in "screened" ice, due to increased sales of small ice machines.

In Nebraska, it was a rainy cool summer and on only one day did the thermometer reach 100 degrees.

A New Mexico plant reports increased sales of about 10 percent both tonnage and dollar volume.

In Syracuse, N. Y., another ice plant was taken over which naturally increased sales.

A North Carolina plant reports tonnage down approximately 12 percent, with dollar volume down only about 7 percent because of an increase in the price of ice.

In Dayton, Ohio both tonnage and dollar volume were up slightly.

From the State of Washington comes a report that ice sales and dollar volume both were down, the decreased revenue being effected largely because of increased wages and other operating costs and a government controlled price which could not be raised to meet the increased costs.

A Canadian report says their increase in sales, equal to 4.5 percent over the previous year in tonnage and 27 percent on a dollar basis was chiefly the result of ice supplied for air conditioning of railway cars. Domestic sales, including ice supplied to independents, was down 2 percent.

Ice sales in Northeast Mississippi were better in 1951 than in 1950, due to weather conditions. There was plenty of rain in the spring, which was not so good for the ice business, but the summer turned hot and dry.

Poughkeepsie, N. Y., reports that for the first ten months of 1951, ice sales just about broke even in volume but were off 3.5 percent in dollar volume compared to 1950. Although not a normal summer season the weather was more favorable than in 1950. In 1949, this company reports ice sales set a new high record, but in 1950 with a very cool summer, there was a drop of 15 percent in tonnage and 18 percent in dollar value.

From Oregon comes a report that the weather during 1951 was favorable to the ice men in the Northwest; that after a slow start the summer turned into an above normal temperature one.

In Texas, one of the favored sections of the nation, the ice season was helped by a long, hot and dry summer and in most markets tonnage was somewhat above that of 1950 and, where price adjustments had been made, earnings showed a decided improvement.

Costs Continue Increase

COSTS of doing business continue to increase, according to the majority of reports. While ice sales are decreasing the costs of delivery and plant operation have gone up. With declining revenues these increased costs pose a real problem for many operators. It is being met, in part, by savings in plant operation, but savings in sales and deliveries are different because they may affect service, which must be maintained.

In Canada, prices at the beginning of the year did not provide enough to meet the increased cost of materials and labor and it is expected that some adjustment will be made in this for next year.

From New Mexico comes a cheerful note. This plant operator says his costs have been reduced every year since he purchased the plant January 1, 1946. He has been replacing machinery and in 1951 he ran the plant at about 75 percent efficiency compared to 25 percent efficiency in 1946. Next year he expects to pull it up to 90 percent efficiency.

A Kentucky distributor says that costs and resulting income in the ice industry are so dependent upon load factor, which in turn is dependent upon tonnage, that it would be hard to say whether costs were in line with income compared to last year and the two previous years due to the impact of three consecutively poor ice seasons, which have so reduced tonnage as to distort the usual comparisons between costs and income.

Northwest Mississippi reports that costs were somewhat higher than last year for labor and materials, with prospects of higher costs in 1952.

From central New York a prominent manufacturer and distributor says their rates are up, insurance

premiums are higher and social security, new health benefits, sales taxes, government reports and controls add to their cost problems. They hope to make savings in their cost of operation with large storage chests for customers and installation of automatic controls in the plant.

From southern New York State comes the statement that with ever increasing cost of labor and materials, selling prices are not in line with the increased cost of operation.

A North Carolina operator says that by improving the efficiency of their manufacturing plants, their cost of producing and placing ice in the storage room was in line with previous years. In fact, the cost of making ice has increased very little over the past several years, he says. But it is a different story on the sales and deliveries, these costs having increased each year and the prospects for 1952 do not look any better.

From Ohio comes an actual figure of about $1.00 per ton higher costs than in 1950 for manufacturing ice.

A Washington, D. C., manufacturer-distributor says their costs were considerably higher for 1951 in comparison with income.

Processed Ice

CONTINUED interest and increased sales of processed ice is reported by nearly all distributors and upon this trend is based largely the possibility of increased ice sales in the future, although increased costs of packaging and delivery is cited as one of the problems. A favorable aspect is that increased markets for ice in this form are being opened through vendors, for poultry icing, refrigerated trucks and meat on ice.

A Canadian company says the processing and packaging of ice tends to add to the cost although bringing a somewhat larger return. Their revenue from this source was about the same as last year, but the tonnage was greater than last year by about 25 percent.

A Kentucky company reports that their sales of processed ice have increased each of the past three years and they expect such sales to show a further increase for 1952.

A Northeast Mississippi distributor reports a steady increase in the use of crushed ice for vegetable cooling, in cafes, for making ice cream and to poultry processors.

A Nebraska company has sold processed ice for 10 years and sales are increasing. One meat market customer is trying out the "meat on ice" idea. If it works, this company will have a new market for ice.

A New Mexico manufacturer-distributor who has developed a vigorous merchandising campaign says he has been selling processed ice for every use he can discover a demand, including in canvas bags to wholesale trade, by vendors in paper bags, and to service refrigerated trucks and vegetables.

From upper New York comes an optimistic report that the sales of sized ice, both in water-tight bushel and half bushel bags and in bulk, shows a nice increase. They are also increasing their sales of ice cubes. Their greatest increase in the sale of sized ice has been to the meat, poultry and vegetable trade.

A southern New York company says their sales of processed ice held up fairly well during the summer, but that there was a decrease from 1949.

About two-thirds of an Ohio concern's business in 1951 was in the form of processed ice. While the sale price is higher, the cost of paper bags and labor, brings the net income to less than for block ice.

From Washington State comes a report that sales of processed ice showed an increase of 110 tons over 1950 and this leads to the comment that this form of ice seems to be the one on which ice distributors should concentrate next year.

A Washington, D. C., distributor says that about 95 percent of the ice they sell is "screened" ice which comes in four sizes.

In Texas, more than three million paper bags of processed ice were sold at an average price of $24 per ton. For commercial use, the demand for processed ice has been steady and has shown a definite increase from season to season.

Vending Stations

VENDING stations are recognized definitely as part of a modern ice business and most of those reporting have vendors in operation, but recognizing their limitations. Plant platform vendors are particularly favored and their usefulness where the plant platform is not readily available for pick up ice is recognized. As a stimulator of ice sales opinions as a whole are favorable, and it is generally recognized that they have definitely increased the sales of processed ice.

In Canada, it is reported that vending stations, unless installed at an ice-making plant where the service charge is eliminated, have not gained sufficient public acceptance to provide an adequate return, partly because of the differential of only one cent for 25 pounds, as against the delivered price.

A Kentucky company vends both block and prepared ice at the plant. They believe vendors have stimulated the sale of ice, particularly prepared ice, and at the same time they know that they have made possible sizable savings in platform labor.

A Mississippi dealer although they do not use them, thinks vending stations offer a valuable service, especially if the plant is not conveniently located to serve the cash and carry trade and for the plant platform for off hours.

A New Mexico distributor is very favorable to vendors while at the same time recognizing that they require work to keep them up. They operate five vendors at the plant, selling a 50, 25 and 12½ lb. block, and a 40 lb. and a 12½ lb. sack of crushed ice. They report that these plant vendors save a lot of labor, are very well liked by the public, and save a lot of stealing. They also believe that vendors at the plant are much more successful and efficient than those in self-contained houses away from the plant.

Syracuse, N. Y. reports two vendors in service but because of the variety of packages and articles sold, they depend on an attendant. This company has about 50 conveniently located cash and carry stations, half of which are under refrigeration, enabling the operator to sell bagged ice cubes and sized ice and also to help in the delivery of large supply loads.

A North Carolina company is using only a very few vending stations, and their experience indicates that they do not provide a complete answer to their problem of distribution.

An Ohio company uses a few vending machines which are a convenience to the public and profitable to the manufacturer, but their opinion is that they do not create very much volume.

Vendors are proving their worth according to a report from the State of Washington, provided they are placed where the volume the year around is sufficient.

A Washington, D. C. distributor has three vending machines. One did very well this year and the other two fairly well. They should be placed convenient for high-class trade, but expensive land makes this difficult. Some mechanical cubers in stores make for severe competition.

Selling Refrigerators And Other Appliances

THE downward trend in sales of ice refrigerators and other ice-using appliances reported last year seems to be continuing. Most of those reporting say regretfully that their sales in 1951 were unsatisfactory, but as usual there are bright spots where this phase of the business was quite satisfactory, and the outlook for 1952 is better. Sales of such appliances as ice cream freezers, picnic chests and water coolers appear to have been in better volume and helped to ease the decreased movement of refrigrators.

The Ice Industry

A Canadian company is now operating a plan of selling ice refrigerators on a 30-day trial with ice supplied free for that period. Backed by personal solicitation this has been accepted with some degree of success although there seems to be a general let-down in the sale of refrigerators, due largely to the more restricted credit terms imposed by the government which affects the sales of all appliances.

A Kentucky distributor who has been selling ice refrigerators and ice-using appliances for many years says that except for ice cream freezers and picnic chests their sales were most unsatisfactory in 1951. However, they expect to do better in 1952 as mechanical refrigerators will be in shorter supply, and the mechanical dealers will have disposed of most of their large stocks of trade-in ice refrigerators acquired during the buying spree of 1950, following the start of the Korean war.

A Mississippi correspondent says there are few refrigerators sold in that territory but that there are quite a few other ice appliances sold, such as ice chests, ice cream freezers, thermos jugs and water coolers.

From Poughkeepsie, N. Y., the report is that they have been selling ice refrigerators for a number of years but their sales in 1951 were the lowest for any of those years, and they do not expect any appreciable upswing in 1952.

A much more optimistic note comes from North Carolina where an ice plant operator says they sell ice refrigerators and other ice appliances and the sale of this type merchandise for 1951 was approximately 50 percent more than for 1950. They are now making plans for 1952 and hope that refrigerator and appliance sales will exceed those of 1951.

From Washington State the report is that refrigerator sales are very limited and they can see no prospects for the coming year to cause them to believe there will be any change.

An Oregon distributor, reporting for the entire Northwest says that only the companies that have worked on the sale of refrigerators and put out good refrigerators during the past years are going to have domestic business in the years to come.

Advertising

WITH the curtailment of National Ice advertising during 1952 there is a general realization that local advertising will have to be stepped up. Most of the companies reporting lean heavily upon newspaper advertising, with apparently satisfactory results. Other mediums are the radio, calendars, posters, and personal solicitation.

A Washington D. C. distributor says the only advertising they do is on their own trucks. They keep them well painted and clean, all closed and no canvass of any kind used.

In Canada, based upon adequate Canadian National advertising, this company uses mediums giving wide publicity, especially calendars and posters, with a radio broadcast enabling them to tell in a conversational way the particular merits of ice as a refrigerant.

In Kentucky the National Ice Public Relations Program was supplemented with a limited amount of local newspaper advertising. In 1952 they expect to use a somewhat larger amount of local newspaper advertising, supplemented by seasonal house-to-house advertising.

Local newspaper advertising is used with quite satisfactory results by a Northeast Mississippi company.

A Nebraska company during 1951 used some special advertising as well as some newspaper advertising. They expect to continue this program during 1952.

A New Mexico company used some radio and some newspaper advertising but claimed they found neither to be successful. The best advertising, they believe, is to make a habit of calling on customers and selling them on ice refrigeration by word of mouth.

A manufacturer-distributor in central New York says their advertisements of ice cubes direct to the buyer has resulted in a decided falling off in the sale of cubers to the trade. They can see a gradual increase in buying of ice on the part of present owners of mechanical refrigerators, as a direct result of advertising pointed to this field.

Advertising in local newspapers has been successful for a southern New York distributor.

In North Carolina a leading distributor has been subscribing to the National Ice Advertising program for the past several years and supplementing this with a modest amount of local advertising. They have had some doubts as to the value of this advertising and now that national advertising has been drastically curtailed, their plans for 1952 are not definite.

A manufacturer-distributor in the State of Washington uses a limited advertising budget for a classfied telephone directory, occasional newspaper advertisements and Christmas presents for the domestic trade.

Selling More Ice

ALL merchandising programs of the ice industry are built on the fact that the basic need of the industry is to sell more ice. While the established markets may be cultivated with profit with the favorable help of the weather, there are new markets being opened up including vegetable icing, poultry icing and the newest of them all, meat on ice. It appears to be these new markets and others that may open up, upon which the industry is depending to keep the sales volume up.

A Washington, D. C. distributor says the outlook for the ice business is not the best, although there will be an ice business for many years to come, even though it may be considerable less than in the past. Loss of retail customers did not count so much in tons as it took about 80 customers to use a ton of ice, but the new machines are now taking the larger customers. He says he knows of no way to increase sales sufficiently to replace the tonnage taken by the machines; therefore, he concludes, all he can recommend is good service and the best ice that can possibly be manufactured.

A Canadian company expresses the belief that the domestic field offers the best return for any promotional effort and that the commercial market, although more promising now, will require considerable educational work.

From a Kentucky distributor the belief is expressed that the new meat-on-ice program which was so enthusiastically presented at the Houston convention will most assurely develop a substantial new market for ice if icemen the country over get behind it and merchandise the idea to the meat industry on a country-wide basis. Then too, if the ice industry will continue to make vended ice more and more available, the market for prepared and cubed ice can be greatly enlarged.

A Nebraska company says the ice business needs a greater volume of sales and at present the iced meat counters seem a logical outlet for increased merchandising. Other new markets are being developed by the National Association and these will add up eventually to increasing volume.

A New Mexico distributor thinks the ice industry badly needs to develop a soft drink vendor to deliver a drink in a paper cup with crushed ice. He has ten of these outlets in his town and they are very profitable. He has lost a lot of business through the shift to electrically cooled soft drink self-service vendors and he thinks much of this business could be brought back with a vendor providing crushed ice. Another item suggested is an ice-cooled air conditioning box for the top of an automobile in which 50 to 75 lbs of crushed ice can be placed for use by tourists.

A New York distributor expresses the opinion that the greater part of the lost tonnage is in the domestic and light commercial trade and he cannot see how all of this can be recaptured. He thinks new uses for ice must be found beyond those of the present.

(Continued on page 59)

Meat counter in F. M. Muncy & Co. store, 1116 So. Salina St., Syracuse, N. Y. This meat counter uses several tons of crushed ice per year with quite satisfactory results.

ICE FOR MECHANICAL MEAT CASES

This new market for ice, scarcely touched, offers a potential annual sales volume of nearly four million tons of crushed ice, as shown by studies of the field.

R. W. DAVIS
Union Ice Co.
San Francisco, Calif.

THIS subject of meat on ice is something we have talked about now for three consecutive conventions, and yet I don't think very many ice men have paid much attention to it. But if they had paid attention to it, if they had gone into their market, tried it out, I am sure they would have been very much surprised at the results.

So that there will be no misunderstanding as to where meat icing originated, as far as I have been able to find out, the Peoples Ice Company in Syracuse, N. Y., has been delivering big tonnages of ice, for I think 18 years, for mechanical meat counters for the display of meat on crushed ice. I visited those markets, 13 of them altogether. The smallest had 40 lineal feet of case and the largest had 140 feet, and never have I talked to anyone who was happier over a system that they were using.

Presented at 34th Annual Convention National Association of Ice Industries.

I have talked recently to many people in the meat business. One of them represented the National Retail Grocers' Association, C. G. Bowes, manager of their meat department, and he told me that today there are thousands of meat markets that are operating in the red; that under these OPS regulations, they are having the toughest time in the history of their business. I said to Mr. Bowes, "If this meat on ice would save those operators 3 or 4 per cent in their business, would it make any difference, really, in their operations?"

He said, "Mr. Davis, if ice will save them just 1 per cent, it will mean the difference between thousands and thousands of markets in the United States operating at a profit or operating in the red."

Here is a slogan that is very catchy. "Meat on Ice" is in the minds and on the lips, I would say, of at least half of the meat market operators in California. But in their minds, as also in your minds, I know, right now is this question: Does meat on ice really work?

Does Meat on Ice Work?

To find an answer to that question, we went to Syracuse on the way to the New York convention two years ago, and we visited markets, and here is the standard method they use. It is a specially built case for this system. In it ammonia or fin type coils are placed under the wrapping counter where they do not interfere with the butcher in placing the meat in or out of the case. It has an insulated bed or bottom on which about 4 to 6 inches of ice is placed, with steaks and roasts placed on paper and directly on the ice. And this is important. If steaks are placed in direct contact with the ice, it will change them to a gray color, but the paper between gets away from that handicap.

One market with 80 lineal feet of

California Meat Market Operator Says You Have To See "Meat on Ice" to Believe It—A Recording

Iced meat counter in Ralph's Supreme Meats, San Diego, Calif. Ralph Winter, owner, is at the left.

THE following are excerpts from a tape recorded interview with Mr. Ralph Winter, owner of Ralph's Supreme Meats, 4805 Narragansett Avenue in San Diego, California. At the time this interview was made Mr. Winter had used ice in his 20 feet of HILL cases for about three weeks.

Q. How do you apply this ice—or use it in your case?

A. We put paper on the shelves then lay a bed of snow ice about 4" thick on the paper and then place chunk ice along the front of the case next to the glass.

Q. Why do you use large chunk ice next to the glass?

A. For the display mostly, and the appearance of the counter. The chunk ice seems to have quite an appearance in the front of the case.

Q. When I first came in your store you had some of the usual green trim in your case—now it's gone. What happened to it?

A. The chunk ice has taken the place of the green trim. The ice adds a much better appearance.

Q. What has been your experience with shrinkage since using ice?

A. The shrinkage has really been surprising. How little shrinkage there is.

Q. How much do you think the shrinkage has been reduced?

A. I'd say around 80 to 85%.

Q. How about trimming? How much trimming are you doing since using ice?

A. The trimming is nil.

Q. You mean you are not doing any trimming at all?

A. That's right. We haven't done any trimming to put meat back in the case for the three weeks we have used the ice.

Q. How about spoilage and mark-downs? Any of that going on now?

A. No spoilage and no mark-downs.

Q. You've done away with that entirely?

Q. Yes, sir!

Q. How about the problem of drainage of juice, or blood, out of the meat into your pans? what has happened on that?

A. You'd have to see it to believe it. There is no drainage to speak of. You would be surprised to see how very, very little drainage there is on the paper we paper the steaks and roasts with.

Q. Do you use paper between the steaks and the ice or do you use all trays?

A. We use paper under our bigger cuts and trays for our smaller cuts, liver and ground beef. All of them go directly on the ice.

Q. Ralph, have you noticed any saving in labor?

A. Yes, I have noticed quite a bit of labor saving since using ice. It takes us much less time to scrub cases because there isn't a chance of small pieces of meat falling down into the pan below the coils so our only job is to get the new bed of ice in the case on Monday morning.

Q. Taking the overall picture—before you used ice and since using ice—which is the quickest and easiest to set up on Monday morning?

A. The ice is, by far.

Q. You mean that you can set your case up quicker with the ice in there, than before you used ice?

A. Yes, indeed. About 45 minutes sooner.

Q. Now talking about individual meat items—steaks for example. What has happened to their color and appearance?

A. Well, steaks hold their bloom two to three times longer than before.

Q. How about roasts?

A. Roasts are about the same. We experimented with one roast and left it in for three days and when we took it out it was just as bright—about as bright—as the day we put it in, and the loss in weight was imperceptible.

Q. How about your ground beef?

A. Ground beef keeps a good color at least twice as long, to my mind.

Q. What about pork, veal and liver?

A. They are a problem to any butcher, but with the ice—it seems to draw the liquids in the meat upwards towards the surface while mechanical refrigeration seems to drive it downward and settle in the bottom. With ice, pork, veal and liver keep their "fresh cut" appearance.

Q. What experiences have you had with luncheon meats?

A. Luncheon meats stay a lot moister and there is no grain or curling.

Q. Have you noticed whether the air inside your display case is any fresher than before using ice?

A. It seems to be a lot fresher than mechanical frost.

Q. Have you had any favorable comment from your customers about the ice display?

A. We have had numerous favorable comments from customers. Mostly on the cleanliness of the whole display. The ice makes the meat look so much more appetizing.

Q. Have you noticed any increase in sale of your higher priced meats?

A. Yes, I have.

Q. Do you definitely believe that it is due to the ice display?

A. Yes. The meats look fresher and it is eye appeal that sells meat.

Q. Have you any idea, Ralph, what these over-all savings will amount to? That is, savings in shrinkage, trimming, spoilage, mark-down and drainage?

A. Off-hand I would say that it is saving me a good 7 to 10 percent.

Q. How much ice are you using in these 20 feet of Hill case?

A. The last time we filled the case with ice it took 500 lbs. and it lasted us seven days.

Q. 500 lbs. of ice and you figure it is saving you 7 to 10 percent?

A. Yes—that is correct.

Q. That ice was a good investment for you then, wasn't it?

A. Yes—I believe it was a very good investment.

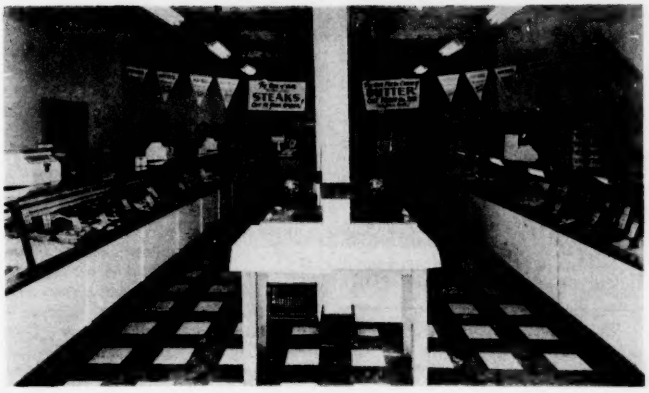
Q. Do you recommend the use of ice in a mechanical meat case to other meat market operators?

A. Yes! I'd recommend it to other meat market operators and I also invite them to come down and see my case.

Q. Thank you, Ralph Winter, for these comments.

meat case has fin coils underneath the wrapping counter. The morning I visited that market there were 14 butchers working behind the counter, 5 men and 2 women in the cutting room in the far end, and women carrying meat out and placing it in the case. Never have I seen such a madhouse of customers in one market before in my life. These cases are wide open in the back, they have no doors on them at all, and the ice consumption is really something.

Again, we recall Syracuse. Yes, they worked it there and they are still going good after 18 years. But that was a specially made case. How about a modern standard built case? How about an old model broken down single plate glass case? How about the little mamma and papa store? Will it work there? Is it practical? How about the big, fast-moving super-markets?



This exclusive meat store, Schisa Brothers Market, 550 South Saline St., Syracuse, N. Y. has used crushed ice in combination with a mechanical meat case for many years.

Problems in Meat Market

Those were questions that were in my mind and I know they may be in yours. So before we go any farther, let's find out what some of these problems are in a meat market that are the result of improper refrigeration.

I found this out by talking to meat men, spread over about a year of contacting them and talking and, just by accident, one will mention one thing, the next time some other butcher will mention something else, but the first thing they talk about is shrink loss, the loss of moisture from meat through evaporation. Meat runs from around 79 to 87½ percent water content and the loss through evaporation in most mechanical meat cases is very surprising.

Now, when meat begins to dry out —I am talking now of fresh meat, beef, etc.—it starts to turn a dark color, and Mrs. Housewife, going into the market, seeing this dark meat, feels it is not fresh and she orders ground beef or hamburger instead. So the butchers work these steaks and roasts and their luncheon meats over, as they put it, and trim off these dark parts, get down to where the meat is bright red again, because they know they have to do that in order to make it salable.

Trimmed Meat Spoils

However, they tell me that once they have to trim a piece of meat, they had better get rid of it in a hurry or it is going to spoil on them. So what do they do? They cut the price, hoping that some housewife will be glad to get a special deal on this meat, and in that way they are able to move it. But it means a loss of revenue to them. So if they do not move it by marking it down, they probably lose it from spoilage and it goes into the garbage can, or is sold to a rendering plant, and again the the amount of money that goes into that cash register decreases.

There is another loss, and it is surprising to what an extent it runs in a meat market, and that is the drainage of blood, or juice, as they refer to it, out of the meat into the meat pan. It then drips down into the bottom of the meat case. One market operator—and it happened to be in a very large market, with fast turnover —told me that they would lose as much as a cupful of this blood out of one platter of round steaks in a night's time, just overnight storage. So all these factors take money out of that man's pocket.

Ice Holds Weight

Now, remember, our produce deal, is a good one, and one of our big talking points is that by putting ice on that produce, it will hold weight, or it might gain a little weight, so when the man puts it on his scales, he is getting his full money back. However, only a small percentage of produce is sold by the pound, and yet even then it is a very strong talking point. In this meat on ice, however, every pound of meat that goes into the market is weighed on a scale as it comes out of the truck. Then it is weighed out on the scales when the customer buys it, but the difference between those two operations, the loss, is money out of this owner's pocket.

Then, again, I find that there is quite a substantial loss through the breakdown of their compressor units or from power failures, particularly the latter, and, surprising to me, it is much more common than we believe. In fact, one market I was in had had two breakdowns, both at night, in one week's time.

But even after all this, we come back again to that question that I know is still in your minds. Meat on ice, does it really work?

Start Special Study at University of California

We had the Syracuse story, so, we set up a research program at the University of California, with the National Association of Ice Industries and the Union Ice Company cooperating.

We talked to the head of the animal husbandry department, and, after telling him the story of what ice would do, and pointing out what it had already done for dressed poultry, and for fresh produce and other products, he called in a young scientist, Dr. Floyd D. Carroll. From then on we received excellent cooperation from the University staff, particularly after they had run and seen the results of the first test.

After arranging, through Dr. Carroll to conduct this study we purchased two new mechanical meat cases. One was changed to have an insulated pan put in it so we could use crushed ice; otherwise, the exterior dimensions and the insulation and all were almost identical. These were set up and the tests were carried on over a period of a year and one-half on fresh meats and on poultry by Dr. Carroll and three student assistants, all three of whom had had experience in their fathers' meat markets.

Identical cuts of meat were placed in two display cases, one case mechanically refrigerated only, the other mechanically refrigerated and stocked with crushed ice, on which the meat rested. Beef roasts, steaks, ground beef, pork roasts and chops were used, and all meat samples were carefully paired. The temperature within both cases was kept at the same point (about 36 F), leaving the relative humidity as the variable. Color changes were recorded by means of Kodachrome pictures.

There are 247,902 retail meat markets in the United States. These markets will use an average of one and a half tons of ice per month per market. On a conservative basis, 1½ tons per month for ten months figures up to a potential new ice market for 3,718,530 tons per year.

A series of experiments was run and in every case the meat displayed on ice lost less weight, remained brighter and retained more moisture than meat in the un-iced case. Trimming was frequently necessary for the un-iced meat, never for that on ice.

Ice Produced Humidity

The ice produced a humidity of 85-90 percent in the case, while humidity in the other case reached a high of 65 percent after defrosting. Beneficial effect of the higher humidity was progressively more apparent.

It is often maintained that weight loss of meat during retail display is of little consequence because turnover is so fast. However, these tests showed that eight steaks, displayed for one hour each without ice, lost a total of two and a half times more weight than one displayed steak lost in eight hours. The explanation is that moisture on the surface of a freshly cut steak is readily available for evaporation. After this evaporates, moisture from deeper within the meat is lost more slowly. Thus, a cut of meat will lose more weight during the first hour than during the second hour, more weight during the second than during the third and so on. With ice in the display case, shoppers can be sure that cuts which have been on display from a few hours to three days will be in top condition at time of purchase.

The steaks in the mechanical case lost 9 percent in weight in 46 hours. They were in unsalable condition at the end of 71 hours and at the end of 113 hours, the loss was 14.4 percent. The steaks in the ice-mechanical case were still moist and bright colored at the end of 113 hours. The loss in weight at the end of 46 hours was 3½ percent and at the end of 113 hours, 4.8 percent. In other words, the ice in that particular case saved about 10 percent in a period of four days.

I might say that the average sale per meat market, that is, where it is a strictly meat market operation and not in combination with a grocery store, last year was $67,500. That came from the United States Census. So any savings that we are talking about really runs into money in a meat market.

Tests on Shrinkage

Now, when we went out and talked to meat market operators, particularly in the larger markets, their common answer was, "Well, look! we are not worried about shrinkage losses; we turn meat over so fast that it doesn't have a chance to dry out." So we asked Dr. Carroll if he would run some tests on that. This particular test ran over a period of eight hours. He cut some steaks and placed them in the case and left them there for eight hours. Then he cut some more steaks, weighed them, placed them in the same case, left them one hour, took them out and weighed them again. Then he cut more fresh steaks, weighed them, put them in for an hour and took them out, and he repeated that eight times. The result showed a loss 2½ times as great as is suffered by the combined weight of steaks that remained in the case for an eight-hour period. In other words, the faster steaks are turned over or sold, the greater the weight loss.

Thousands of retail meat markets are now operating in the red. The savings offered by ice in preventing shrinkage, spoilage, down grading, and other losses would mean the difference between thousands of these markets operating at a profit or at a loss.

Loss of Moisture

"Now", he said, "that is sensible if you think about it a little bit. Suppose, for example, you and I took a shower bath early in the morning. I took one bath during the day but every hour you took a shower bath and you walked out in the sunlight. Probably at the end of an hour, your hair would be dry, and then you would go back in and take another shower and come out. At the end of an hour, that would be dry, it would be evaporated again. Now, which of us during the day would lose the most moisture from our hair through evaporation?" Of course, that answered it, and I found it a very effective example to use in talking to meat men.

Now, the problem of ground beef. How does ice in the mechanical case affect the discoloration and also the loss in weight of ground beef? This particular check ran over a period of 42 hours. This table shows how two samples of ground beef were comparatively affected.

	Iced	Uniced
Initial Weight	2.0 kg	2.4 kg
Percent loss in weight at:		
11 hours	0.4	1.6
20 hours	0.7	2.7
35 hours	1.4	4.4
42 hours	1.7	5.1

At the end of 11 hours the un-iced ground beef in this test was dry, dark and crumbling apart. It lost 5.1 percent in weight in 42 hours as compared to 1.7 percent, approximately, on the ice in the same period. The ground beef was dark at the end of 24 hours in the mechanical and still bright colored at the end of 42 hours on ice.

Does it Work?

Now we come back to the question: "Does this thing really work out in a retail store? That might be all right in Syracuse, where they have a special case for it, it might be all right in the University, where none are working in and out of that case, but what happens when we get into the retail store? Will it work in a little, neighborhood market? Will it justify the expense of the ice where they sell just a few dollars worth of meat a day? Will it work in the bigger supermarket, where they have a terrific turnover and the meat doesn't stay in

In tests at the University of California, the meat displayed on ice in mechanical cases in every instance lost less weight, remained brighter and retained more moisture than the samples displayed in un-iced mechanical cases. Trimming frequently was necessary for the un-iced meat, never for that on ice.

that case very long? Will it work in old broken down meat cases? Will it work in the meat cases that have blowers in them, single duty, with just display at the top? Will it work in meat cases with storage in the bottom or double duty, as they refer to them?"

These are questions that we had to ask and had to find the answers. In other words, will meat on ice reduce shrinkage losses, reduce trimming losses, reduce spoilage, markdown losses, drainage losses? Will it eliminate the hazards from breakdown losses?

I am going to play for you a recording which I made in a meat market out in California. I have approximately 35 of those and I think I could play any one of them and the answers would all be about the same. (Note: A typical recording mentioned here is published on the second page of this article.)

The Market for Meat on Ice

What is this market for this meat on ice? The last census lists 3,192 ice dealers. In the New England States, there are 15,987 meat markets; in the Atlantic Coast States, 80,548 meat markets; in the North Central States, 77,518 meat markets, in the South Central States, 47,515; in the Mountain States, 7,868; in the Pacific Coast, 18,466.

This shows a total of 247,902 meat markets in the United States that have meat markets in combination with grocery stores, and also exclusively meats. Taking this total of 247,902 meat markets, we get some very interesting tonnage figures. The smaller markets, we have found, used about one ton per month per market. But as we moved into the larger markets this ratio naturally increased considerably. Considering all sizes and shapes of markets, but still trying to be conservative, we have figured one and a half tons per month per market for 10 months of the year, which would give a potential tonnage figure for the country as a whole of 3,718,530 tons per year. This, I fully believe, is the hottest deal the ice industry has had for many years.

While we have lost produce ice customers, not because of the job the ice did, but because of the high ice bill, I haven't heard one meat market operator complain about the cost of the ice in their meat cases. And there is another angle in the fact that many markets which use ice in their meat counters, as a result of the big improvement ice has made with their meats, are now icing their mechanical produce counters with resulting increased use of ice.

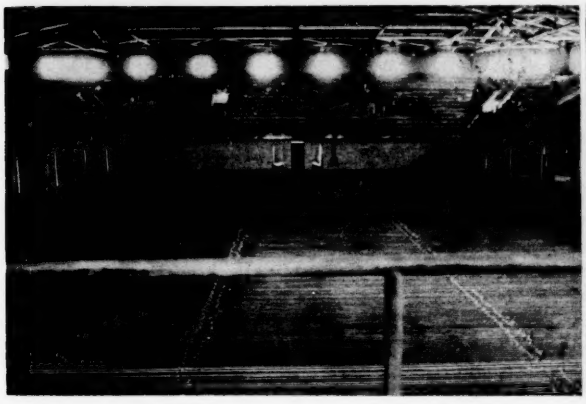
New Recreation Center Includes Modern Ice Skating Rink

ICE shows, hockey matches, and recreational ice skating have been available since last winter to the people of Huntington, W. Va., and its metropolitan area. The new Huntington Memorial Field House, a million-dollar recreation center built by the Cabell County Recreation Board, has an ice skating rink 180 by 80 ft. This recreation center serves 86,000 people in the city and 100,000 more within an area extending beyond county lines and even over the state line.

Its construction, contracted by Frick Company, Waynesboro, Pa., required installation of more than 40,000 ft of 1-inch steel pipe on 4-inch centers. Each two floor lengths of pipe are welded together at one end through a hair-pin bend and are individually welded at the other end into feed and return headers. Each loop of pipe has a hand valve between feed header and floor. There are no expansion joints. Standard 21-ft. lengths of Spang-Chalfant black steel pipe with regular mill coating were welded together to carry the refrigerating medium, calcium chloride brine. The brine piping system is laid on a 6-inch thick concrete floor resting on 3-inch corkboard in asphalt, which serves as insulation, and a foundation of 5 inches of concrete on clay. Concrete is used as a filler also.

Cooling System

The cooling system carries from 400 to 1000 gallons per minute of brine cooled by Frick refrigerating equipment of approximately 100 tons capacity. Corrosion inhibitor for the brine is sodium dichromate.



Brine piping for the ice skating rink in new Huntington Memorial Field House, Huntington, W. Va. The Spang-Chalfont black steel was installed by The Frick Company, Waynesboro, Pa. Architect was Lewis E. Stettler.

Steel header connections and feed line valves for brine circulation in the skating rink floor of Huntington Memorial Field House. Sodium chromate controls calcium chloride brine.

The Ice Industry

Ice Company Files Damage Suit Against Road Builder

THE Holmes Ice Corp. of Nixon, Texas, has filed suit in Judicial District Court at Gonzales for $14,794.18 damages against the M-J Construction Company of Beeville. The suit is an outgrowth of work done on Highway 87 by the Beeville firm last summer. In the course of rebuilding the road the construction firm damaged an ammonia conduit which ran under the highway and connected the ice plant with the Holmes Packing Plant, the petition alleges.

Holmes charges in his suit that from July 13 to August 1 he was able to operate his ice plant at only half capacity, and from then until September 15 was unable to operate. The corporation is seeking $7891.16 damages for loss of business, $346.91 for loss of ammonia, $427.20 for ice purchased, and $1328.91 for replacing the conduit. They also are requesting $5000 exemplary damages.

Damage Suit Dismissed

FORTY-SIX negligence suits seeking damage of $2,000,000 from the city and the American Ice Company of New York City were dismissed by Justice Joseph A. Gavagan of the New York Supreme Court. The suits resulted from the collapse of a wall of the ice plant December 12, 1946. Twenty-eight persons were killed and sixteen injured when the wall fell against a tenement house at 2515 Amsterdam Avenue.

Justice Gavagan ruled that the plaintiffs had failed to prove negligence. The complaints had charged that the company was negligent and careless in failing to maintain the plant in a reasonably safe condition and that the city had failed to take proper precautions to protect the occupants of the tenement.

Ice Used for Moving Big Press in Auto Plant

ENGINEERS in an automobile plant in Detroit used 60 tons of ice to solve a problem. During a model change-over, a 275,000 pound stamping press had to be turned on its side for shipment to another plant. Workmen stacked 350 cakes of ice behind the press, and tilted the press against it. As the ice melted, the press sank gradually to the floor.

Historic Papers Are Preserved in Ice

A RICH lode of Colorado lore is being sorted out at the Denver public library after being delivered in a seventy-five-pound cake of ice. Issues of the Daily Journal published in the 1880's in then-booming Breckenridge were discovered in now-sleepy Breckenridge by a Colorado author and a state senator. Forbes Parkhill, the author, and Robert A. Theobald, the senator, had to crack a safe to make their find.

While the townspeople of Breckenridge gathered in an advisory knot about a ten-foot square safe standing in the ruins of the old postoffice, Parkhill, Theobald and a Dillon mechanic cut through the old strong box. Parkhill was looking for some biographical material but found instead a seventy-five-pound cake of ice. Water had leaked into the drafty safe and frozen all of the assets.

Ina T. Aulls, director of the western historical department of the Denver library, was on hand for the grand opening. After peering through the ice, it appeared that the papers were in readable shape. The ice cake with its paper content was then loaded into a car and sped off to the Denver library to thaw out. Library employes tenderly sorted out the papers while in the basement other issues were being dried out for future use.

This cold storage library of Colorado history is the property of Theobald. It is more than fitting that Mrs. Alys Freeze of the library is in charge of the thawing-out process.

Ice Company Adds Battery Service

FOR the first time in its 65 year history, the Random Ice & Coal Co., Milwaukee, Wis., is venturing into a line not directly connected with its regular business. Paul F. Hoff, secretary, said that the firm expects to open a battery rebuilding and service department, which also will act as Milwaukee area distributor for a battery additive made by Pioneers, Inc. of Oakland, Calif.

Random's garage at the rear of its property at 1300 E. Locust St. is being remodeled to accommodate the battery department. A sales office for the additive will occupy space in the firm's main building.

The battery additive is a chemical intended to reduce the formation of lead sulfate on plates.

Vegetable Growers See Corn Icing Story Told in Pictures

The pictorial story of the Ohio corn icing tests, along with an iced vegetable display, was featured by the National Association of Ice Industries at the 1951 convention of the Vegetable Growers Association of America. Reprints describing the tests were handed out. The convention, conducted jointly with that of the New Jersey State Horticultural Society, was held in Atlantic City December 2-5. Attendance approximated 500. John G. Pool of the National Association set up and managed the exhibit.

Reports from Unit Ice Associations

Delta States Ice Association Draws Good Attendance at Annual Convention

THE 1951 convention of the Delta States Ice Association December 3-5 was blessed with ideal weather and there is no finer spot to hold an ice convention than the Buena Vista Hotel in Biloxi, Mississippi, right on the Gulf.

Twenty attractive exhibits were set up inside the entrance to the convention hall and all delegates passed by these exhibits going to and from the business sessions. Also on display in the exhibit hall were the many handsome gifts presented by associate members to be used as prizes for the bingo game.

Opening Session

The convention officially opened Monday with President C. C. Tebbetts presiding. Father Scully, Church of Nativity, of Biloxi, gave the Invocation. Mayor R. Hart Chinn extended a royal welcome to the coastal city and gave an informative talk on the origin and development of Biloxi. The response by Hermes Gautier fully matched the Mayor's oratory.

The remainder of this session was given over to reports of Treasurer E. L. Wise of Warren, Ark., Secretary Bob Milling and President Tebbetts. Mr. Tebbetts gave a factual talk on ice progress, beginning with his experiences when harvesting ice from the lakes and ponds in the North—to the flush ice years of the roaring forties.

Travel Talk

Since our national economy is presently so closely interwoven with all the countries of the world, the address by E. L. Wise entitled "Do You Like to Travel" was timely and of vital interest. For the several years Mr. Wise travelled three months each year in different foreign countries and he is a past master in finding and reporting on places and events of unusual interest.

Price Regulations

Zeno Mangum, Office of Price Stabilization, Jackson, Miss. gave a lucid explanation of the price regulations as they pertain to the ice industry. Also he outlined the procedure by which individual ice plant owners might get relief from low ceiling prices. Under the present setup, applications for higher prices can be filed and processed in the regional offices in each state.

National Ice Picture

Guy W. Jacobs, executive secretary of the National Association of Ice Industries reported on "The National Ice Picture." He presented a realistic over-all picture of the ice industry as it is today and the activity of the National office in meeting the problems. Particular emphasis was placed on the government rules and regulations imposed by Congress and the increasing efforts of the National Association to have these restrictions loosened up sufficiently to permit the ice manufacturer to operate at a profit.

Mr. Jacobs also outlined the activities of the Public Relations program and it is truly amazing to know the amount of advertising our industry has received from a comparatively small monetary outlay. The campaign to raise funds for the Public Relations program never received the support of the rank and file of the ice industry, and it was too big a load to be borne by so few. Therefore, the campaign to raise additional funds has been dropped and the money on hand directed toward educating groceries, meat markets, bars, etc. on the superiority of ice for refrigeration.

Associate members present were introduced and asked to say a few words.

Good Government

Opening the second session Tuesday, Dr. Robert W. French, Executive Director, Public Affairs Research Council of Louisiana, Baton Rouge, spoke on "Developing and Maintaining good Government." The audience was astounded by Dr. French's figures on government cost and waste at municipal, state and national levels. The greater portion of his remarks were directed toward waste in Louisiana government. Over 50,000 people work for the state and national government in Louisiana. The State's constitution, in its short existence has had over 200 amendments. The drift toward centralized government and the stifling of free enterprises progressing at a terrifying rate and only the intelligent effort of well informed citizens can eventually turn the tide toward a stabilized government with a balanced budget.

National Research

C. P. Austin, director, Research and Engineering Dept., N.A.I.I., delivered an address entitled—"National Research in Selling Ice." He reported on the efforts of his department to discover new markets for ice. Remarkable progress has been made in the handling of sweet corn as a result of working with various universities and colleges. This is one project that appears to be getting the wholehearted cooperation of some of our major chain grocery stores and should ultimately result in benefits to the ice man at the local level.

Another project of immense importance to the ice man at the local level are the glowing results from experiments in the icing of mechanical meat cases. Naturally the success of this tonnage builder will depend largely upon the initiative of the individual ice plant operator. These and kindred subjects were explained more at length at the panel session during Wednesday's meeting.

"Remarkable Remarks" by Boyce House, author, newspaper, radio and television columnist of Fort Worth, Texas, provided a most pleasant hour full of fun, entertainment and homespun wisdom.

Final Session

At the last day's session, C. T. Baker, consulting engineer, delivered an address containing much valuable technical information. This information is particularly valuable to the average ice plant operator, now that manufacturing costs and labor costs and difficulties are ever increasing.

The Ice Sales Forum conducted by G. Thomas Frazer of Monroe, La., was the best presented at any convention. The panel was composed of Alex S. Hill, Jr., N. Little Rock, Ark., C. P. Austin, Washington, D. C., Alden Baker, Harrisburg, Ark., J. C. Ruppert, Little Rock, Ark., and Bob Milling. Lengthy speeches were dispensed with and the entire period was given over to questions and answers.

The subjects covered included ic-

ing of mechanical meat cases, vegetable icing, icing of sweet corn, poultry icing, sale of ice using appliances, vending machines, etc. More than 50 questions were answered and detailed explanations were given whenever necessary. One undeniable fact is apparent—a thorough knowledge and exploitation of the subjects discussed will bring undreamed of prosperity to the ice industry.

Entertainment

In addition to the president's Cocktail Party on Sunday evening where old friendships were renewed and new ones made, on Monday, December 3, the ladies enjoyed a seafood luncheon at the Broadwater Beach Hotel, with eighteen ladies winning beautiful and unique draw prizes.

The bingo game on Monday evening was a big success. Thirty-two beautiful prizes donated by associate members were awarded to the lucky winners. Tuesday morning, the ladies participated in a "Brunch" at the Buena Vista, which comprised a special radio program and coffee hour. Tuesday afternoon was clear and springlike for the conducted tour, which included a visit to famous Keesler Field, to "Beauvoir", the last home of Jefferson Davis, President of the Southern Confederacy and other historical spots.

For the Tacky Party, banquet, floor show and Dance on Tuesday night, a rural setting was effected, complete with red checkered tablecloths and lanterns.

Officers and Directors

At the Tuesday session of the convention, officers and directors for 1952 were elected as follows:

President, J. C. Phillips, Hattiesburg, Miss.

Vice-President, J. W. Dawley, Dallas, Tex.

Vice-President, N.A.M. Jackson, Marigouin, La.

Treasurer, E. L. Wise, Warren, Ark.

Directors-at-Large: R. A. Jones, Hot Springs, Ark.; H. R. Ritter, Marked Tree, Ark.; W. S. Moss, Baton Rouge, La.; W. J. Sanches, Baton Rouge, La.; L. S. Pittman, Columbia, Miss.; J. E. Todd, Grenada, Miss.

Arkansas: S. H. Atkinson, Texarkana; Alden Baker, Harrisburg; C. J. Bulloch, Little Rock; Harry Hill, Jonesboro; E. F. Paulus, Jr., Warren; W. A. Dumas, El Dorado.

Louisiana: J. H. Harris, Alexandria; E. L. Folse, Thibodaux; S. P. Gates, Lafayette; Andrew L. Yerger, Mounds; Ross Johnson, Shreveport; C. R. Wilson, Alexandria.

Mississippi: J. R. Sexton, Clarksdale; Frank J. Searcy, Jackson; E. F. Hutson, Houston; Paul Gibbs, Fulton; J. F. Sims, Hattiesburg; J. B. White, Fayette.

Canadian Association Annual Convention Holds Conference Sessions

THE 30th annual convention of the Canadian Association of Ice Industries was held at the Royal York Hotel in Toronto, Ontario, on November 22, 23 and 24, 1951. Delegates from the United States were Miss Muriel Washburn, secretary of the Florida Ice Association, who brought "Greetings From The South" and appeared on the opening day's program and Daniel Prager who gave a talk on "Vending Machines" in the Friday session.

Advertising Program

Following the opening session, a comprehensive advertising session outlined the program for 1951 and the proposed program for 1952. Saturday, November 24 was devoted to a labor forum and the current problems of labor management were discussed. This session proved to be an extremely valuable one and everyone thought that it was very worth while.

Each of the sessions was conducted on the conference basis with tables being set up in horseshoe fashion and delegates were free to ask questions from their place at the table. Needless to say, this arrangement gave the members the feeling that they were a discussion group and much lively discussion ensued.

There were representatives right across Canada from Vancouver, B. C. to Truro, N. S. and those who attended, felt that it was a highly successful convention.

The ladies were entertained at the Granite Club for lunch and delegates and their wives were entertained at the Oakville Club for lunch on Thursday and at Little Denmark Restaurant on Thursday evening there was a get-together for the delegates and their wives.

The President's Party on Friday evening was well attended and the guest speaker, John A. Marsh, M.B.E., General Manager, Canadian Exporters' Association, gave a very fine address "Joe Doakes—Canadian".

Sessions were all held in the forenoons, leaving the afternoons free for the delegates and their wives.

The Ice Industry

Officers and Directors

Officers and new directors for 1952 were elected as follows:

President, C. W. Goodrich, Vancouver

Hon. Pres., H. J. Fairhead, Toronto

Vice-President, W. W. Staples, Toronto

Treasurer, J. E. T. Dade, Toronto

Executive Secretary, Mrs. Mildred Croft, Toronto

Honorary Directors: A. W. Williams, Toronto and M. S. Horn, Montreal

Directors: W. Bowie, Toronto; J. K. Griffin, Calgary, Alta.; I. Greenberg, Toronto; J. Grassick, Regina, Sask.; C. C. Hillmer, Oakville, Ont.

Canadian Association Of Ice Industries

MILDRED CROFT, Secy.

A NUMBER of Canadian ice companies during 1951 installed automatic vending equipment for the first time and many of them were very pleased with the results.

Some companies enjoyed quite a good year but unfortunately sales were down in some areas, but not to the extent that they were in the United States.

The Association used newspaper advertising for the first time, advertising in some 29 cities across Canada. The money was spent mostly in the areas that contributed to the advertising fund. The contributing members were allowed to tie in their own ad with the national ad and this feature pleased many of the members.

We are planning on additional newspaper advertising for 1952 and advertising funds are coming in at a satisfactory rate.

Oklahoma Association Of Ice Industries

HARRY T. HUDSON, JR., Exec-Secy.

THE 48th annual convention of the Oklahoma Association of Ice Industries will be held at the Burlingame Hotel, Bartleville, Okla. January 20, 21 and 22, 1952. Registration will begin Sunday afternoon January 20 and the convention will end at noon Tuesday, January 22.

Business sessions will be up to the high standards maintained by this association in previous years. Entertainment will include a buffet supper, bingo party, two cocktail parties, a convention luncheon and dinner dance and, for the ladies, a trip to the world-famous Wollaroc Ranch and Museum.

Southwestern Ice Manufacturers' Association

PRESTON A. WEATHERRED,
Executive Secretary-Counsel

THE Texas ice season for 1951 was helped greatly by the longest, hottest and driest summer since 1925. In most of the markets of the state the sales in tons were somewhat above those of 1950. From the earnings point of view, many of the operations in Texas show a decided improvement over 1950. This is the prevailing situation where realistic price adjustments had been made prior to the prize freeze. The picture is very different in those markets where prices are frozen at pre-Korean levels.

The experience of the 1951 season brought out some very interesting factors. The most interesting and important of these is that the average realization per ton, in most markets, shows material increase. This is the result, of course, of the greater and constantly increasing portion of the business that is devoted to the sale of processed ice. The Texas experience definitely confirms the thought of the progressive element of the ice industry that is devoting itself to the promotion of the processed ice market.

It is the old lesson that so many ice men have been reluctant to learn, that the customer is willing to pay any reasonable price for service to which he is attracted. For example, in Texas during this last season, well in excess of three million bags (paper bags) were sold from the plant docks, from the vendors, from other stations, and to a far less extent from the routes. The average price at which this luxury or convenience ice was sold was around $24.00 per ton. It is the opinion of those who are close to and who are promoting this phase of the ice business, that the market for this type of ice service has not yet been fully initiated, much less developed.

The demand for processed ice for commercial uses has been steady and has shown, in the great majority of markets, a definite increase from season to season. The weakness in this particular part of the business, is that the prices are still not commensurate with the cost of the service and with the value of the service to the customer.

The overall picture seems to be developing along the lines that, although tonnage may continue to show some decrease, realization per ton can be steadily improved as well as overall net earnings.

Involved in this situation, of course, is the problem of adjusting, or rather, reducing production capacities and operations to more nearly conform to the tonnage demands. Aside from the car icing service, gross tonnage appears to be on its way out as the measure of the prosperity, or lack of it, on the part of individual operations and of the industry as a whole. Probably it is not a too unhealthy development that ice men, specially the oncoming generation of ice men, are more concerned with the final black figure in the lower right hand corner of the annual statements, than they are with volume.

In the ice industry circles of Texas, of course, the great event of the year was the National Convention that was held at the Shamrock Hotel in Houston in November. In the opinion of the numerous ice men of Texas who attended this convention, the program was geared to the present situation in which the industry finds itself. The down to earth reports of ice men from various sections of the country of successes with which they are meeting in developing the outlets that are open to the industry, served to firm up the confidence of the more progressive element of the industry. The opportunities for development of the ice market and for improved earnings, were convincing to any who really wanted to be convinced.

Short Course on Ice Manufacturing

Association activities include plans that are now afoot for the holding of the third one week Short Course at A. & M. College on ice manufacturing. The course is scheduled to be held the week beginning January 20. Special appeal is being made this year to owners and managers to attend this short course. Many of these found themselves without efficient engine room labor during the last season, and a great number did not have the engineering experience and skill necessary to direct the operations of their engine rooms. During these times of shortage of labor and of the need for all possible economies in production, the Board of Directors of the Association and its Technical Committee feel that the Short Course is a special and pressing need at this time.

The annual convention of the Southwestern Association will be held at the Texas Hotel in Fort Worth for three days beginning March 12, 1952. The plans for the convention were the major topic of discussion at the Fall meeting of the Board of Directors that was held in Dallas on December 12.

As a result of the experiences of 1951, the industry leadership is contemplating with confidence the year 1952. It is realized, of course, that losses to mechanical refrigeration both in the domestic and in the commercial field, specially in the domestic, will continue to be serious. Nevertheless, the industry experience definitely points to opportunities for compensating earnings.

The situation calls for managerial skill, possibly as never before called for in the ice industry, but in this it is in nowise different from that of other industries. Labor shortages, losses to competition, increased costs, adjustment to emergency regulations, are certainly not the headaches alone of the ice manager. While the flush earnings of the war years are definitely ended, still the Texas ice man, as a rule, is contemplating that he will be able to show in 1952 earnings that must be accepted as satisfactory and that, as a matter of fact, will compare favorably with the earnings of other major industries.

Joint Convention to be Held in Missouri

AN INTERESTING program has been arranged for the joint convention of the Kansas Association of Ice Industries and the Missouri Valley Ice Manufacturers Association to be held January 7-9, 1952, at Hotel President in Kansas City, Mo.

The following speakers will appear on the program: Virgil Conkling, Office of Price Stabilization, Kansas City; Walter W. King, regional director, Wage Hour and Public Contracts Divisions of U. S. Department of Labor, Kansas City; Charles D. Hawks, Poultry and Egg National Board, Chicago; Ted L. Joule, Extension Economist in Marketing, University of Missouri, Columbia, Mo.; Richard C. Muckerman, City Products Corp., St. Louis; L. L. McCoy, chief engineer, City Products Corp., St. Louis; Guy W. Jacobs, National Association of Ice Industries, and Morris Shlensky, vice president and general manager, Katz Drug Company, Kansas City.

An outstanding floor show has been promised by the entertainment committee for the dinner dance to be held on Tuesday evening, January 8.

A luncheon will be held on Tuesday, January 8, at which the speaker will be George H. Charno, Sr., special assistant to the United States Attorney, Kansas City, Mo.

Northwest Association Of Ice Industries

LU MARSH, Secretary

THE year 1951 so far as weather was concerned was favorable to ice men in the Northwest; after a slow start the summer turned into an above normal temperature one. In this section, weather is a deciding factor in the volume of ice sales. Ice is "bought" rather than "sold," and the one thing that makes more ice bought is that old sun working.

The demand for block ice in the general market continues to decrease; domestic tonnage is getting less every year and users are not demanding block, but processed ice. There are not as many large customers and there are an increasing number of small customers. The large ones have put in their own ice making equipment to a large extent, but they are still using some ice to supply their extra needs beyond the capacity of the machine.

The domestic field is holding up in direct relation to the efforts made several years ago in the sale of good ice refrigerators. Those companies which sold refrigerators four, five and ten years ago still have these customers and stops are close enough together and ice is taken in regular and dependable quantities to allow them to be served at a profit.

A good market can be developed for sized ice among domestic and semi-commercial customers. These customers are buying ice now in ever-increasing quantities, and this market is the one that is willing to pay a price that permits a profit.

The price consciousness of the ice industry, I believe, is not justified. Our product should be sold at whatever price is necessary to operate at a profit. The public today is buying ice in ever-increasing quantities at prices that allow us to make money, in fact the price that the customer pays is not a consideration with him; his interest is in how he can get the ice when he wants it in the way he wants it. That is the market we have to look for for future business.

The big trouble with the ice business is that the demand for ice is decreasing. To meet this situation, we will have to work harder to teach the people how to use it, and the operations of the ice business are going to be successful in direct relation to the work we do on this merchandising.

Indiana Association of Ice Industries

ROBERT WALTON, Secretary

BUSINESS in Indiana continues at approximately the level which has been maintained since midsummer. There is some evidence that prices are firming, and that higher, rather than lower, prices may predominate for some time in the future. Defense plants and equipment expenditures are still close to a record high, although we have passed the period of rapidly advancing levels of industrial production and capital expenditures. Plant and equipment expenditures will undoubtedly decline before many months, while at the same time there will be further curtailment of the production of consumer durable goods.

If the arms program continues on schedule, the slack in business, which will come from the decline in consumer durable goods production and plant construction, will be taken up by an increase in the finished product of the defense effort, tanks, guns, aircraft, transportation equipment, etc. From this point forward or at least until our productive facilities are able to take care of both defense and civilian needs simultaneously, allocations of materials and government contracts will determine the levels of production for most industries.

The association will again offer training to ice service men in 1952. G. Elwood Hookey of the Indiana University Department of Distributive Education will conduct this program planned as a means of stimulating interest in the ice industry as a business with a future. Details of this important activity will be announced in the near future.

Members are reminded again that the association is in a position to give assistance in publicizing ice in local communities. Avalable is the film "Naturally Yours" and a short talk by the association secretary to civic and other groups.

Pennsylvania Ice Plant Suspends Operation

THE ice plant in Hazelton, Pa., which the Schuylkill Ice Company has been operating for 31 years suspended operations November 15. The plant took over the site of the old Voorhies ice and and coal yards and for many years supplied regional business places and homes with manufactured ice.

Refrigerator Gets Hot

WHEN her refrigerator got hot instead of cold, Mrs. Mary Sarris of Boston called for help. Firemen arrived in time to carry out her red hot ice box and extinguish a small blaze in her kitchen. They blamed a short-circuit in the refrigerator.

Views of the Florida 1951 ice convention at Daytona Beach. Left, President E. E. Melton, Mulberry, hands gavel to his successor, R. A. David, Jacksonville. Center, ladies of the convention at their annual banquet in Palmetto Women's Club building. Right, a part of the audience at one of the sessions.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Leland Kenagy, Newton, Kan.
Treasurer, National Association
Practical Refrigerating Engineers

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OPERATING

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Factors in Air Conditioning Design and Operation

E. R. HALLOWELL

THE calculation of an air conditioning load is not a simple matter. It involves the application of many design rules and basic heat transfer formula as well as the addition of practical experience in design and operation. This paper is not primarily concerned with the design of equipment or calculation of loads but rather with some of those factors which are sometimes overlooked and which can cause more or less serious consequences in the proper operation of a system.

The past summer has been one of the hottest on record in the Southwest. Existing installations have been put to a severe test and some have not survived. New installations have shown some surprising results, some that certainly were not intended in the original design. The following paragraphs are a resumé of some of the observed difficulties which beset air conditioning systems as a result of omissions in design or operation. Some of the items are small and others may bulk large. All of them are sometimes overlooked. To limit the scope of the paper, most of the items are concerned with the air handling system itself rather than with the basic refrigeration equipment.

Electric motors are always a source of heat. Tables will show that a one horsepower motor operating at full load is doing work at an equivalent rate of 2546 Btu per hour. In addition, the friction and other losses of the motor are also given off as heat so that the total heat equivalent per horsepower will probably average about 3000 Btu per horsepower. On large motors with a high efficiency, this figure will be somewhat lower and on small motors it may be more.

Almost all designers take into account electrical loads external to the air conditioning equipment but sometimes overlook the energy heat equivalent of the motor used to drive the fan or pump of the air conditioning equipment itself. It should be remembered that any energy put into the driving of air or chilled water must be removed eventually as a heat loss from the system. In many systems the air handling equipment is in the conditioned space. If this is true, then the full Btu equivalent of the electrical input to the motor must be removed as part of the heat load of the system.

If the fan motor is located outside of the conditioned space, then only the actual horsepower expended by the fan need be considered. Horsepower expended in pumping chilled water through a system must also be considered as a heat loss since this energy is lost as heat in the system and must be removed. It can be seen from this that a total load in fans and pumps of ten horsepower will require in excess of two tons of refrigeration just to absorb the heat generated by the components of the system. This can make a difference when the peak load hits and can be enough to cause a job to give only mediocre results.

In the small package type air conditioning units that are quite popular, the capacity is usually given as net to the treated area but some care should be exercised in selection since there is some heat emitted from the unit itself due to the losses in the driving motors. The heat equivalent of the electrical energy losses in the motors usually must be removed in the treated area when the unit is within the area and this should be considered when such a system is proposed. Too often no serious attempt is made to do any design work for one of these small systems and the results are hit or miss. Many failures are not equipment faults but only failure to provide a large enough unit to do the job.

Another source of heat that seems obvious but is often neglected is the heat given off by steam and hot water lines passing through a treated area. Quite often these lines are without adequate insulation and can emit a

Presented to the 42nd Annual NAPRE Convention.

large amount of heat to the conditioned space. Hot lines have also been observed paralleling condenser water and chilled water lines closely enough to cause trouble by the addition of undue amounts of heat to these lines. Such lines should always be well insulated whenever they run through conditioned spaces or close to the refrigeration system.

Direct Heat Gains

In many air conditioning installations the air handling units are placed outside the conditioned space in an equipment room, attic space, or other area with little air circulation. There are two things that are especially important to watch in such an installation. During hot weather conditions in an attic, engine room or restricted area, temperatures can rise to as much as twenty or thirty degrees above the outside temperature due to sun loading. This means that a high ambient temperature may surround the air handling unit.

With the standard thickness of insulation usually furnished in air handling units, a severe temperature rise of the conditioned air passing through the air handler is sometimes experienced. Temperature rises of three or four degrees and even higher have been checked due to this condition. Obviously such a condition cuts down severely on the ability of the system to pick up sensible heat in the treated area. It is often necessary to add additional insulation either internally or externally to the air handling unit to cut down on this heat addition to the treated air. The same thing is true in duct work running through an untreated area and the same precautions should be taken.

Air leaks into the suction side of the duct work or connections to the fan section can often cause trouble. In some instances air is drawn through a coil bank to a fan section located some distance away. In such an instance as this it is very important that the duct to the fan be sealed tight since any leak inward of hot air will result in a lowered capacity. Leaks in duct work on the pressure side of the fan section do not cause the trouble of those on the suction side since the leak is cold air outward and unless too severe means only that the normal fresh air into the system is dissipated outside of the treated area.

This leakage will not particularly affect temperatures but may cause a staleness of air within the treated zone. More than this, if the pressure leaks are large, pressure will be removed from the treated area and hot air from outside can enter through various cracks and thus tend to throw the whole system out of balance. Careful duct insulation and tightness is as important as proper duct sizing. Of course the insulation of chilled water lines and other cold parts of the system are important also. Any unnecessary losses from equipment place an additional burden on the entire plant with resultant higher operating cost and possible failure to make the grade during extreme weather.

The best laid plans and designs can go awry when every problem and condition a job must meet is not taken into consideration. More often the deficiencies show up when the operator of the system is called upon to produce full capacity. That was true of many air conditioning systems during the past summer in the southwest when an annual heat wave hit and stayed for a long time.

What happened was observed and studied by Elliott Hallowell. Drawing from this experience he has given many cautions and suggestions which will be helpful alike to designers of new systems and operators who want to obtain best results from present plants. Mr. Hallowell is chief engineer of Snell Refrigeration Supply, Dallas, Texas.

Heat Lag

Any air conditioning layout is usually designed by a set of arbitrarily chosen outside weather conditions usually based on weather data over a number of years. These conditions are usually adequate and in fact are seldom reached except for a few hours each year; but once in a while, as in the Southwest this past season, a whole series of days which equal or exceed the standard conditions is experienced. It is at such a time as this that all the small and not so small ommissions in design show up and some systems fall by the wayside in their ability to provide the best conditions. It is here that only careful operation will keep things going at top efficiency.

One of the first things to keep in mind is heat lag and heat build up. In a lot of installations it is normal to cut off the air conditioning in the periods when a building is unoccupied and to turn it on shortly before occupancy. This works out all right in normal times but can cause trouble in abnormally high temperatures. It should be remembered that in buildings of heavy construction there is a considerable lag in that the afternoon sun load may not actually get inside the building for several hours which will often tend to heat a building in the night even when outside temperatures are cool.

It may therefore be necessary during extreme conditions to operate continuously to keep proper conditions within the buildings. This heat lag and resultant heat build up can be a serious disadvantage in buildings which get only occasional use since because of this heat lag, the heat load in the building keeps building up. The lag causes almost a continuous build up of temperature with the result that the entire interior of the building; walls, floors, ceilings and furnishings all absorb heat.

It might be argued that the relatively cool night air would make itself felt in the morning to cool down the building. This does not follow however, since the glass and other light constructed parts of the building carry heat loads in very quickly so that it is not unusual to see buildings with an interior temperature fifteen and twenty degrees higher than early morning outside temperatures. This imposes a tremendous initial load on an occasionally used air conditioning system and if the equipment has been designed on normal heat loads, it is almost impossible to bring such a system into the comfort zone in the usual period alloted for the pull down. This is especially true in churches and auditoriums. Even with the extra capacity available usually used for occupancy loads, it is still a problem to pull down such a building quickly.

Solutions

One solution to this problem is the installation of large fresh air ventilating fans which can circulate large volumes of cool night air through the building and exert enough cooling effect to keep the building temperature at a reasonable level so that it can be cooled when needed without too much trouble. Some effect can also be obtained if the regular air conditioning blowers are arranged so that they can circulate 100 percent fresh air in place of the extra venti-

lating fans. This same heat lag which hurts the seldom used system can be an advantage in the system which operates continuously. This is especially true in residence work.

The advantage lies in the fact that the time lag spreads out the peak conditions to a lower level. As an example, a structure with an insulated ceiling and walls will not give up its wall and roof load peak heat at the time of highest outside temperature when the heat load on glass and fresh air to the system are at their greatest. Because of this, the peak output of a system need not be so great since the heavy load is spread over a long period. The total ton hours of operation will not vary but the peak load on the system is reduced.

This is true of insulants with a thermal lag. With reflective type insulants the heat lag is not so apparent and higher peak loads may be experienced. In a system designed to take advantage of this thermal lag, it should be remembered that they must operate continuously and if they are shut down for a period, it may take some time to bring back perfect conditions. This fact has been shown very clearly in residence installations which were shut down because of one reason or another. If they were down for any length of time, it was found that several days were required to re-establish proper conditions.

Refrigeration Storage

A word should be said here of accumulator systems which have come into use for churches and other like buildings which are used at infrequent intervals. In this system a water tank or tanks filled with refrigerated plates of one type or another or pipe coils is used. Ice is built up on the evaporator surface during a long period and melted off for air conditioning during a relatively short period when the building is in use. Usually a mixing valve is used to blend return water from the air units with the ice water to obtain the proper supply water temperature.

The compressor unit used in this system may be only a fraction of the size that would be required in a normal system since it can operate over a long period of time to store refrigeration for use. The first cost of such a system is usually somewhat less than a conventional system. Although the energy required is somewhat higher per ton at the lowered temperature required for making ice, the total energy cost is usually less than with a conventional system where energy cost is based on a demand charge as well, as an energy charge since the small compressor requires only a minimum horsepower. There are a few items worth noting on the installation and operation of such a system.

Since these are occasional use jobs, air handling equipment used with such a system should be oversize to handle the heat build up in the building or exhaust fans should be installed. It will usually be found that the horsepower required for air handling units and pumps will be about as much as that required for the small compressor and auxiliaries. By the installation of adequate ice build-up surface, the compressor can be cut off entirely when the air conditioning is in use with a substantial savings in demand charges and lower operating cost.

Installations operated in this manner have been found to offer substantial power cost savings over those which operate the compressor and air conditioning at the same time. Ice build-up is controlled by suction pressure control or thermostat or mechanical ice gauges all designed to control the thickness of ice. None of these devices is too effective if the ice is not used up completely at intervals since the ice does not melt entirely evenly and a new build up on top of residual ice will therefore be uneven. The best results are obtained if the ice is melted off completely at regular intervals. This time interval can best be set by observation of the actual installation. The accumulator system works very well if designed and operated with reasonable care.

Another version of this system is the storing of chilled water only. While this version has the advantage of operating at somewhat higher machine efficiency than building ice, it has the disadvantage of requiring a large water storage space due to the fact that only a small amount of heat absorption can be stored in water as compared to ice.

Comfort Control

In operating any air conditioning system, assuming that the capacity is adequate, the best conditions from a comfort standpoint are usually reached during peak outside conditions. This is true since the primary design data is usually based on peak outside conditions and so proper inside temperature and humidity conditions prevail during peak outside conditions. In many instances, systems show up at a disadvantage during partial loading periods. This is especially true in the smaller systems which operate with direct expansion on an off-on cycle of compressor operation. The result of this type of operation is that the humidity in the treated area varies over an excessive range so that a feeling of clammy cold is experienced during the time the compressor is off due to moisture re-evaporation from the cooling coil. Machine capacity controls, reheat, face and bypass dampers and other means all help this situation and this type of control should be used more than it is. With the tremendous increase in the use of air conditioning of the past few years, it is believed that better methods of control will be a necessity before too long.

As a final item, the matter of inside design temperature should be given a careful look. At one time, a temperature difference of twenty degrees was considered entirely adequate for comfort at peak conditions. Experience has shown that many things vary this. Many specifications are written today specifying a temperature of 80 F. and 50 percent relative humidity inside when it is 100 degrees outside. This does not satisfy any one as a rule. Probably this condition has changed over the course of years. Originally when air conditioning was more of a novelty, any lowering of temperature was welcome and the occupants of an air conditioned space did not tend to be critical.

Air Conditioning Accepted

Over the past few years air conditioning has become almost universal and the result is that people now look upon air conditioning in many sections of the country as an accepted thing in business, stores, hotels and even residences. They are accustomed to it and much more critical of it. The result is a general demand for lowered temperatures. Residential air conditioning probably requires the lowest temperature. The housewife who is busy and active about the house wants to feel comfortable and likes a temperature as low as 72 degrees even though it be well over a hundred degrees outside. In office buildings and like occupancies, temperatures of 75 to 78 degrees seem to meet with favor.

It is probably true that no two people agree on what temperature suits them best but it is definitely believed that the majority of people are much in favor of an inside temperature in the middle seventies when it is one hundred or above outside. The humidity is still probably best around fifty percent. This fact should be

recognized in the design of air conditioning systems and adequate equipment provided to meet these conditions.

The art and science of air conditioning is yet young and is robust and healthy. It still has a considerable amount of growing to do to achieve maturity. Advances are being made in design and control. Many of these come from the people who operate these systems since they are the ones who live with the job and hear the complaints. It is hoped that the few suggestions and observations discussed will be of some benefit. They are the actual gleanings from numbers of installations and were obtained largely from those who operate and install them. All of us are prone to make errors. When we can profit by our errors, they are not in vain.

N A P R E Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Chilling Costs

Question No. 904: Can you explain the various factors in the cost of furnishing and operating a room for chilling meat. The room is 40 ft. by 25 ft. by 10 ft. high. In it we will chill 35,000 lbs. of meat daily. This meat comes from the smoker at about 110 F and is cooled to 38 F. The room has 8 in. brick walls with 4 in. thickness of corkboard insulation all around. All these are interior walls. The floor is on the ground and overhead is a dry storage space, not cooled. Power costs 1¼ cents per kwh.—R.G.M.

ANSWER: The principal factors in the cost of furnishing and operating the meat chilling room are as follows:

(1) Initial investment in room, insulation, doors, rails, hangers, etc.

(2) Maintenance of room and equipment.

(3) Initial investment in refrigeration plant.

(4) Maintenance of refrigeration equipment.

(5) Usage or load factor on room and plant.

(6) Cost of electric current.

(7) Cost of water and refrigerants.

(8) Period of amortization of fixed assets. (Rate of depreciation.)

(9) Prevalent tax rate, and casualty insurance rate.

(10) Potential market with probability of expansion.

I would not attempt to compute all of the various items listed above. It is my opinion, however, that the cost of current and water would be much less than the other items. I figure that the current cost per month would run about $88. per 30 day month when the outside temperature is 90 F with an inside temperature of 30 F.

The heat loss through insulation in 24 hours is about 400,000 Btu, and the cooling of the meat is about 2,275,000 Btu including 20 percent extra for miscellaneous losses. This requires a 9.3 ton compressor operating 24 hours per day, and 11.15 Brake horsepower motor load. If the running time is cut to a maximum of 18 hours the compressor and motor brake horsepower must be increased one third.

The amount of power consumed would not be affected very much in colder weather so long as you continued to cool the meat from 110 F to 38 F, because the room load is such a small part of the total.—H. G. Venemann.

Chilling Unit

Question No. 905: I assume a chilling room of the type described would not be refrigerated with coils. What type of refrigerating unit would you recommend for this room?—R.G.M.

ANSWER: It would be difficult to get enough pipe coils in this room to absorb 111,500 Btu per hour and maintain a 15 degree evaporating temperature. I estimate that 3570 lineal feet of 1¼ inch coils would be required, even with 24 hour operation.

For that reason unit coolers would no doubt be better than pipe coils. Some might advocate brine spray diffusers, in which case you would never be bothered with defrosting problems, but you would introduce another problem, namely that of maintaining the brine up to proper concentration. —H. G. Venemann.

Protection for Ice Cans

Question No. 906: Our ice cans are rusting on the outside. Is there any finish the ice plant engineers would recommend for application to these cans to retard damage from this rusting? Is metallizing successful?—I.L.S.

ANSWER: I would suggest that the party use a corrosion inhibitor in the brine in the form of chromates, and maintain a residual of at least 300 parts per million. Where cans have not rusted too badly around the brine line, a small protection may be had by coating with aluminum and a refined fish oil. A paint made of refined fish oil and red lead also forms a fairly good coating which is a protection. In either case, however, the surface must be thoroughly cleaned before applying any coating.—L. P. Reiss.

New Questions

Freezing Popsicles

Question No. 907: We are setting up a section of the plant to freeze popsicles at the rate of 600 dozen per hour. They will be 2¼ in. wide, ⅞ in. thick and weigh 3½ ozs. The common formula for ice freezing time does not apply, apparently because of small thickness and low temperature. What I would like to know is the freezing time for these popsicles with brine at –20 F. In stating the freezing time please give the brine circulating velocity required to produce these results.—T.J.M.

Commutator Undercutting

Question No. 908: What is the current practice in the maintenance of commutators on small motors? Sometimes the segments of insulation separating the commutator bars appear to require undercutting to produce good operation. In some cases, however, the brushes do not wear at all well when the commutator is undercut. I would appreciate your comments and suggestions on the best procedure.—R.L.I.

Suction Trap Size

Question No. 909: At the convention there was a question about how to size accumulators or suction traps so that they would positively separate the liquid ammonia carried with the suction gas. We were told that all liquid will drop out when the gas velocity through the trap is less than 200 ft. per minute. Apparently it is quite important to reduce the gas velocity to a sufficiently low figure if positive separation of the liquid and gas is to be obtained in the trap.

Will you please demonstrate how this calculation is made? For instance will you calculate the dimensions of a trap for a 20 ton load where the ammonia suction pressure is 3 pounds gage?—C.G.N.

News Notes and Chapter Activities

Los Angeles

By Fred Herr

TO Edgar M. Marrs of the Union Ice Company's Hollywood plant on December 5 came the unusual distinction of being elected president of the largest NAPRE chapter in the United States after only six years membership when Los Angeles Chapter chose him by unanimous vote to direct its affairs in 1952.

Convening on December 5 in its first business and educational session since October 17, the chapter held an action-filled meeting. The agenda included the annual election of officers, a general business session, a spirited refrigeration quiz program, and a community sing. This latter was one of Entertainment Committee Chairman Ed Nelson's pleasant surprises which he springs on the chapter occasionally without mention of it in the meeting notice.

Other officers and committeemen elected were, in addition to Mr. Marrs:

First Vice President, Frank G. Muzzy, Skasol Products Co.

Second Vice President, Frank Eccleston, California Consumers Corp.

Secretary, Donald M. Byl, Union Ice Co.

Treasurer, E. T. Quinn, Pacific Fruit Express.

Sergeant-At-Arms, Joseph F. Granger, Royden Ice Co.

Robert H. Savage of Water Chemists, Inc., was elected chairman of the Board of Directors, with the following to serve with him on the board: Michael Julius (California Consumers Corp.), Clifford C. Nordholm (Baker Refrigeration Corp.), W. W. Perry (California Consumers Corp.), and C. P. Scott (Union Ice Co.)

Retiring President George Paulick (California Consumers Corp.) heads the new Advisory Board, with past-presidents Dale Rycraft (Peterson Manufacturing Co.), and Rudi Kettler (Fairbanks-Morse Co.) comprising the other two board members.

Jack Snyder (Drayer & Hansen) was named to the important post of class instructor. This is a task for which he amply qualified himself during the past several months by demonstrating the necessary refrigeration know-how, a professional classroom technique that gains the respect of the students, plus personality, which is so valuable an asset in conducting small, intimate class groups of 10 to 20 men.

The new officers were to be formally inducted at the first meeting in 1952 on January 16. President-elect Marrs has named the following standing committees, which also were officially to take office on January 16:

Educational: Regis Gubser (Calif. Consumers) chairman; Ralph E. Hitchcock (Authorized Supply Co.); Jack N. Day, (Penzoil Co.), F. T. O'Hara (Lockheed Aircraft Co.), H. N. Royden (Royden Ice Co.), Robert H. Savage (Water Chemists, Inc.), A. M. Shears (Los Angeles Board of Education), E. W. Smith (C & S Equipment Co.) and Jack Snyder (Drayer & Hansen).

Entertainment: Ed. L. Nelson (Union Ice Co.) chairman; Frank Eccleston (California Consumers Corp.), Delmar E. Luedke (Royden Ice Co.), Douglas M. Picket (Hawkins Chemical Co.), and Rudi F. Kettler (Fairbanks-Morse Co.).

Membership: W. R. Burnett (Royden Ice Co.), Donald M. Byl (Union Ice Co.), Henry W. Hawkins (Hawkins Chemical Co.), Frank R. Elliott (Union Ice Co.), E. A. Johnson and Ralph M. Moore (California Consumers Corp.), C. C. Nordholm (Baker Refrigeration Corp.), V. A. Stubblefield (Pacific Fruit Express), H. R. Murray (Terminal Refrigerating Co.), and R. L. Maple (Union Ice Co.).

Attendance: Frank G. Muzzy, (Skasol Products) chairman, S. E. Brush (Standard Oil Co.), H. G. Lyman (Pennzoil Co.), W. B. O'Connor and J. W. Welsh (Pacific Fruit Express).

The membership was gratified to note that W. R. Burnett had again agreed to head the membership committee which in 1952 will have ten members, one more than in 1951. Burnett's previous success in this position is reflected by three pennants and one plaque which hang on wall during the meetings, emblematic of Los Angeles Chapter victories in the 1950, 1949, 1948 and 1947 drives. He has set his sights on recovering the top spot in 1952 which the chapter lost by so small a margin in 1951. Frank G. Muzzy's attendance committee was reappointed without change in recognition of the fine job it performed in 1951 in keeping attendance at the semi-monthly sessions to a high average per meeting.

George Paulick presided over the business session. Ed L. Nelson, reporting for the entertainment committee, revealed that the November 7 Fall Festival had been a social, sports and financial success, with receipts slightly exceeding expenses. The change in locale, which this time was the Palos Verdes Country Club where the members could play golf in the afternoon and have dinner at the club in the evening, was enthusiastically received, Nelson reported, and will, if possible, be repeated in 1952.

Regis Gubser, with an assist here and there from Don Byl, gave an extemporaneous report of their trip to the national convention in Memphis. On the plausible theory that a report of the actual technical talks and convention activities could be read in Ice and Refrigeration, Regis gave an amusing description of his and Don's sightseeing wanderings around Memphis when they had several hours to spare before their plane for home took off.

Frank Elliot of the membership committee urged that the narrow margin by which Los Angeles lost the 1951 membership campaign indicated the need for an additional push in 1952, possibly during the two summer months when regular chapter meetings are in suspension.

The educational part of the meeting was in the form of a Quiz Program. Frank Elliot again presided as quizz master. As a question on some tricky problem was submitted by a member, Mr. Elliot called upon some known authority on that particular subject to offer a solution. In most cases involving some eight or nine questions, an answer was quickly forthcoming; but on one question every one present admitted a solution to be lacking.

The question was submitted by Herbert N. Royden: "How can you make merchandizeable ice out of Metropolitan District water without deionizing?

The unanimous opinion was that the water situation in Los Angeles is a serious one for ice manufacturers if they attempt to operate without deionizing the water. A California Consumers Corporation representative declared that before his firm installed deionizers, it was found that when the soluble solids in the water exceeded a certain percentage, it was necessary to get the solids out or "white" ice would result. He stated that while methods of getting the solids out of the water exist, ". . . the end result will be that you will wind up deionizing".

The entertainment provided by Nelson's entertainment committee was in the form of a songfest, with a professional piano player leading the way. A thorough going-over was given to such old-time favorites as *Down by the Old Mill Stream, Little Gray Home in the West, Home on the Range, White Christmas* and a number of others.

The preliminary class was conducted from 7 to 8 p.m. by Jack Snyder. The subject was Fundamentals, Pages 16 to 20 in the Refrigeration Course by Guy R. King.

Chicago

By E. B. Jones

AT THE meeting of November 20 members of other engineering societies were invited to attend the special open meeting of Chicago Chapter. The subject of discussion which was handled in round table form was "How to get the Best Job for the Owner." The speakers who represented consulting engineers, contractors and plant owners were:

A. R. Carlson, Chairman, Railways Ice Co.

William Bodinus, Carrier Corporation.

Willard Kampman, Creamery Package Mfg. Co.

Paul Kroeschell, Kroeschell Engineering Co.

H. O. Jackson, Swift & Co.

Alex Boone, Skidmore Owings and Merrill.

Mr. Jackson had a prepared paper to open the discussion and said he preferred to think of the subject as "How Can the User Get the Most for his Money?" He answered this question with several basic considerations. These are: careful selection of equipment of the most suitable type, purchase at the minimum price consistent with good quality, use and maintain the equipment properly.

The choice of equipment he said should result from good cooperation between the engineering and purchasing departments. The purchasing agent should have good close relationship with representatives of the suppliers. Of course, he said, it is important to use suppliers who give good service and are honest. Fair play and mutual respect, he said, are of great importance. After the equipment is purchased it should be carefully installed and the manufacturer should be the type who is interested continuously in having the equipment give good service after installation.

Mr. Boone explained that obtaining the maximum for the user is a somewhat complex problem. For this reason he defined the relationship which should exist. Then he went on to describe how a good consulting engineer will make a thorough investigation especially with the Operating Department so that the practical details of operating needs and problems will be thoroughly understood when the equipment is specified and chosen. Mr. Boone emphasized that a good consulting engineer is one who acts as an information collection agency. Then he goes on to evaluate the information and to use his knowledge and experience in making up the composite views and needs into a specification. He suggested that the speakers give some idea of what data is most desired by the applicant from the engineer and architect.

Mr. Kroeschell emphasized four requisites. He said these were to select a good engineer to design and specify the job; use equipment adequate to fulfill the specifications; turn the work over to a qualified contractor and finally see that the job gets adequate service after installation.

Mr. Bodinus said that selection of the contractor is most important and he detailed the qualifications of a good contracting organization, as well as the methods it pursues in handling a job. Of course he said good equipment should be used and the type most suitable for the application should be chosen. The supplier should be well established and in position to give good service, as well as fulfill all warranties. In conclusion he stressed the fact that intelligent and well informed operators are of great importance to insure that the plant will do the required work over a long useful life.

Mr. Kampman recognized that equipment must be chosen to meet the plant requirements. But also he said the job must be done within the limits of the amount of money the purchaser has to spend. This does not mean he said, that cheap equipment is indicated but rather that good judgment must be used in its selection. He expressed the opinion that a good design occupies a minimum of space and should provide reliable operation, low operating cost and easy maintenance. Application is just as important as quality of equipment. Proper application, he said, results from good engineering to fulfill the particular requirements placed on the plant.

In the summary Mr. Carlson said it is apparent that the lowest overall cost and the best results are obtained for the owner when an engineer is hired to design and specify the plant. Then this is followed by selection of good equipment and careful installation under the watchful guidance of the engineer.

The Refrigeration Course which consisted of the first section on refrigerants was presented by Emerson Brandt. He discussed the requirements and characteristics of refrigerants and illustrated them by specifying an ideal refrigerant and showing what results would be obtained from it.

The second meeting of the period was opened with a sound movie which featured the annual auto races at the Indianapolis Speedway and described how they are used as a testing laboratory in the development of better automobiles and tires. The movie was produced by the Firestone Tire and Rubber Co.

The instructor for the Refrigeration Course was Harold Michler who discussed the common refrigerants. Many questions were asked and answered in the discussion period which followed his lecture.

Then the meeting was thrown open for a general round table on plant operation. The group participated in answering the problems and questions which were presented.

Memphis

By CHARLES CONLEY

The officers elected to serve Memphis during the coming year are:

President, Cecil W. Sullivan.
First Vice -president, H. A. Davis.
Second Vice-president, Wm. E. Thweatt.
Secretary, Charles A. Conley.
Sergeant-at-Arms, Jack Baker.
Chairman, Educational Committee, Alvis J. Clay.
Chairman, Entertainment Committee, Doug Smith.

Naturally the 42nd annual convention held in Memphis has been the subject of much discussion at the following meetings of the chapter. Doug Smith, Entertainment Committee said he was happy because the ladies told him they had a good time and enjoyed it all. Alvis Clay expressed satisfaction because the educational part of the program went over so well. Safety Chairman William Brooks said he was happy because Earlwood Barden of his company made a safety talk that was acclaimed by all the attendants. Secretary Conley was gratified that the overall results were so good and the money worked out all right.

The special speaker at the meeting was John Thrithart, field engineer, General Electric Co., who showed a sound movie recently produced by his company at an estimated cost of $175,000. Entitled "Pipe Line to the Clouds" this picture gave the background and the story of the water shortage that is developing throughout the world. Mainly this is due to the waste of water by industry and in homes. Population growth is rapid but the use of water is increasing at a greater rate. At the same time sufficient steps are not being taken to replenish the ground water supply as rapidly as it is being drawn off. The picture was made with the assistance of the U. S. Geological Survey.

Recently we have welcomed to membership Jack Berry, assistant engineer, Methodist Hospital; John Rollow, chief engineer, Southwestern University, Herman Stanley, assistant engineer Memphis Packing Co., and Lee Roy Carter, Sr., Chas. C. Carter, H. T. Spilley and Everett Darby all of Memphis Cold Storage Warehouse Co.

Colton

By H. O. BONTER

THE regular meeting was held at the Santa Fe Ice Plant in San Bernardino. There was no special speaker for the evening and the group held a round table discussion on the subject of Freezing of Meats and Poultry. Also discussed were the temperature and other conditions in rooms for the holding of frozen meats. This was in line with the report from the Memphis Convention given by our delegate L. G. Schroeder. He gave a very detailed report of the program and the subjects discussed at the 1951 national convention.

Information from the east revealed that Mr. Schroeder made an appearance on television in connection with this meeting. He represented the association in responding to the address of welcome at the convention. This part of the program was shown as a local news cast over a Memphis television station.

This was the first meeting attended by H. O. Bonter since he was injured by a fall in late August. He wishes to express appreciation to everyone for remembering him with cards and letters and those who called to see him while he was in the Southern Pacific Hospital in San Francisco.

The meeting was closed with the usual refreshments.

San Jose

By GORDON ROSE

OUR 1951 activities were concluded at the December 10 meeting with the selection of the following officers for 1952:

President, Joseph W. Sullivan.
Vice-president, Gordon W. Rose.
Secretary-Treasurer, E. W. Roggy.

We have had a very interesting year, highlighted with plant visits to American Can Co., Beal Refrigeration and Santa Clara Cold Storage & Freezer Co. We also had some outstanding guest speakers including civil engineers from the Weather Modification Co., and the Santa Clara Valley Water Conservation District. A metallurgist gave us some very valuable tips concerning the use of alloys in welding and brazing. Standard Oil Co., Westinghouse Electric Co., Shell Oil Co., Hartford Insurance Company and Santa Clara University also contributed to our programs.

Our present instructor, Prof. Ray M. Schumacher, was very pleased to receive the full set of the Refrigeration Course as it gives him a chance to prepare for the meetings in advance. He remarked that the Guy King Course is the most complete and easiest to understand that he has ever encountered.

Fresno

By K. W. Findley

WITH deep regret we report the death of Marinus Pedersen most recently secretary of Fresno Chapter. While at work on transformers in the local plant of the Pacific Fruit Express Co., Mr. Pedersen came in contact with a high voltage line. As a result he received a fatal shock.

Mr. Pedersen was a native of Denmark and had lived in Fresno for 15 years. A sincere and likeable person he was a constant worker in the chapter and its associated affairs. Surviving are his wife, Ruby, two children, Gary and Joan; a brother and sister in Denmark.

St. Louis

By H. B. Suter

It is a pleasure to report that new members continue to come in in order to take advantage of the Refrigeration Course. Recently we have welcomed to membership: John McCarthy, William Conrad, Sherman Merkel, Wilbert Siesennop, Henry Klingle and George Womble.

The course is being presented by John T. Dabbs and the interest shown in the review sessions and the questions indicates that good use is being made of the material.

NAPRE Announces Membership Committee

THE personnel of the new Membership Committee was recently announced by President A. R. Carlson. It is composed of representatives from all sections of the country who will be responsible for supervision of the work in their districts:

William S. Baker, Safety Seal Piston Ring Co., Fort Worth

Ray Burnett, Royden Ice Co., Los Angeles

Milton Rambo, Consumers Ice & Packing Co., Lancaster, Pa.

Ray Toddhunter, Pacific Fruit Express Co., San Francisco

George Whitman, Whitman, Holloway, Olivier, New Orleans

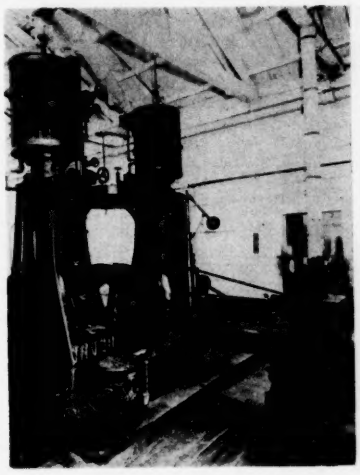
Elected to head the committee at the Memphis convention was Howard Peterson, Yakima, Washington. He was prevailed upon to continue the excellent work carried on while he was president of the association in 1951.

Napa Agency Awarded Plaque

THE Napa agency of the Union Ice Company, Napa, Calif., recently was awarded a plaque for superior maintenance of grounds, buildings, and equipment. The perpetual trophy was accepted by William Porter, local company manager, from V. V. Ogburn, Union Ice general manager, at a dinner meeting.

Ice Machine, 51 Years Old, Still Ready For Active Duty

THE Minden Cotton Oil and Ice Company at Minden, La., has a fifty-one year old ice making plant that can be recalled to active duty within two hours, the time it takes to get up steam.



Veteran ice-making machine installed in Minden ice plant in 1900. Serving currently in a standby status this York "A" frame compressor can be recalled to active duty within two hours, the time it takes to get up steam.

The veteran machine, built by York Corporation in 1899 and installed in 1900, performed yeoman duty at the Minden plant until 1941 when it was honorably retired because of economic factors rather than geriopathy (diseases of old age). Plant superintendent R. D. Miller declared that the machine is still in tip-top working condition, and could if necessary be returned to work in any ice emergency at a moment's notice. The ancient York plant, reminiscent of the early days of mechanical ice making, has a total manufacturing capacity of forty tons.

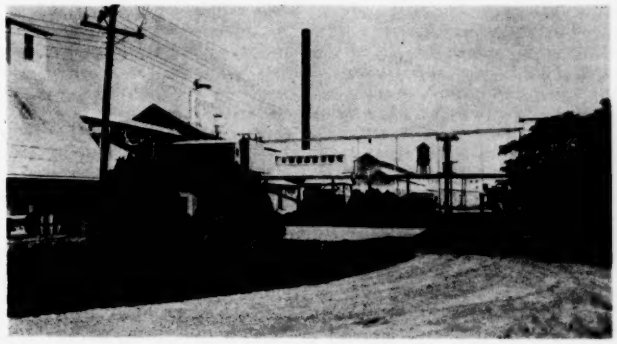
Steps to Stop Valve

Famous as the "A" frame machine from the shape of the heavy castings upon which the cylinders were mounted, this museum piece is so high—18 feet—that a set of steps were cast in the frame to reach and operate the stop valves. The crankshaft is about 11 inches in diameter, while the main bearing caps weigh nearly 110 pounds.

At the time York's "A" frame was popular the South was considered the best market for ice makers, as the North had a well established and booming business in harvesting natural ice from rivers, lakes and ponds and storing it in ice houses for summer use.

Only One Breakdown

Being a pioneer in the ice machinery business, York found in this rugged relic a fitting testimony to quality and endurance. Miller reflected that only once in its 40 years of operation had the machine broken down, and that was when "some pipe line broke and the compressor started to race before the slow acting governor could cut off the steam."



Side view of Minden Cotton Oil and Ice Company plant at Minden, La.

ENGINE ROOM POINTERS –

How to Figure Heat Losses When Using Fuel Oil

THE following is a good rough and ready way in which to determine heat losses when oil is used for fuel:

A—Multiply the percent CO_2 in the chimney gas by 5; to the product add 700; and multiply the sum by 0.08.

B—Subtract the temperature of the air entering the furnace in deg. F. from the chimney gas temperature and multiply the difference by the percent of carbon in the fuel.

C—Multiply the percent CO_2 in the chimney gas by the Btu value of the fuel per pound.

D—Multiply the above A by B and divide the product by C. The quotient is the percentage of fuel loss.

Thus for example if the heat value of the fuel oil used under given boilers is 18,000 Btu per pound; 88 percent of the oil is carbon; the flue gas contains 7 percent CO_2; the chimney gas temperature is 600 F.; and the temperature of the air entering the furnace is 75 F. What is the heat loss up the chimney due to low CO_2 and the temperature rise of (600 – 75) 525 degrees F.? Substituting in the above rules we have:

A—7×5 equals 35. 35 plus 700 equals 735. 735×0.08 equals 58.8.

B—$600 - 75 = 525$. $525 \times 88 = 46{,}200$.

C—$7 \times 18{,}000 = 126{,}000$.

D—$58.5 \times 46{,}200 = 2{,}702{,}700$. 2,702,700 divided by 126,000 equals 21.4. The fuel loss is therefore 21.4 percent.

Now let us assume that conditions have been improved to the extent that the CO_2 becomes 12 percent and the chimney gas temperature is reduced to 500 F. The temperature of the air entering the furnace is still 75 F., hence the "difference" is 425 deg. instead of the former 525 deg.

Making use of the above rules in the same way as demonstrated above it will be found that the fuel loss is now 10.5 percent instead of the former 21.4 percent.

The question may now arise: How much fuel is saved by improving the CO_2 and chimney gas temperature? The answer is *not* 21.4 percent—10.5 percent or 10.9 percent as is often mistakenly given as the answer.

To make the point perfectly clear, let us say that you burned 100 pounds of fuel. In the first problem, above, you lost 21.4 percent, or, you lost 21.4 pounds of fuel. It is that 21.4 pounds of fuel you want to save and *not* the entire 100 pounds, therefore, 21.4 lb. is the basis of this problem.

Then, in the second problem, above, you lose only 10.5 percent of the fuel, or, 10.5 pounds. You therefore save (21.4 lb.—10.5 lb.) 10.9 pounds of fuel. To determine the percentage saved, then, you divide the 10.9 by 21.4 and as a result find that the fuel saving is 51 percent.

In the form of a formula it would be this:

$$\frac{L_b - L_a}{L_b} = S$$

where,

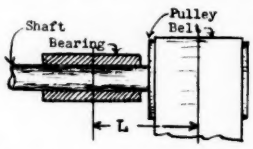
L_b = Per cent loss of fuel before improving conditions;

L_a = Per cent loss of fuel after improving conditions;

S = Fuel saved as a result of improving conditions.

Virtues of Narrow Drives and Bearings

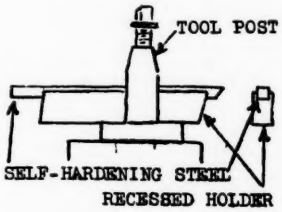
THE accompanying sketch shows why wide drives and wide bearings are so often discarded today and replaced by narrow drives such as chains and narrow bearings such as ball bearings. The distance "L" shown in the sketch should be made as short as practicable. It is difficult to make the distance "L" short with ordinary belts and ordinary plain bearings, as shown in the sketch. L is the "lever arm" between the center of the pulley or other drive and the center of the bearing. The greater the distance "L" the larger must be the shaft to withstand the bending.



A manufacturer on the Pacific Coast has found that in many instances the first cost of a machine, with highest efficiency ball bearings and chain drives, will actually be less than the first cost of the same machine equipped with less efficient wide drives and sleeve bearings. In addition, the weight of the machine is less, freight costs are less, the machine occupies less space, and its all around efficiency is higher.—S.W.F.

Home-Made Tool Holder For Repair Shop

REFRIGERATING plants that have their own repair shop, including lathes, may find this tool holder of interest. This writer made it for holding long lengths of self-hardening steel. A groove was cut in a tool steel bar into which the self-hardening steel fits from the top, as indicated by "Recessed Holder" in the sketch. The tool post screw thus serves simultaneously as a clamp for both the cutter and the holder.



Inasmuch as greater lengths last considerably longer in this way there is a definite saving in cutting steel. When worn too short for use in this holder the short cutter pieces are used in holders of standard design.

Measuring Diameter of Steel Cable or Wire Rope

IF YOU use a steel cable, and if for one reason or another you should be called upon to give its correct diameter, would you know how to measure it?

Offhand it might seem like a simple thing, and it is simple, but there is a RIGHT way and a WRONG way as shown in the accompanying sketches.

The correct diameter of a wire rope is the so-called diameter of a "circumscribed circle." That is, draw a circle that will completely enclose all of the strands and make that circle as small as possible without cutting through any of the strands. That is a "circumscribed circle" and it explains why the sketch marked RIGHT is the correct method. A circle of the diameter marked WRONG would cut through the outer strands.—S.F.W.

Engineers Discuss Technical Problems At Annual Meeting of A. S. R. E.

A GOOD registration of about 500 members and guests greeted the annual meeting of the American Society of Refrigerating Engineers held at New Orleans, La., December 2-5, and all the sessions were well attended.

The ladies reported a delightful entertainment program which included boat trips and visits to shops in the French Quarter. The French Quarter had a thriving business from members and the famous restaurants were patronized by many. The banquet at the Roosevelt Hotel was well attended and many of those present were in masquerade costumes.

At the welcome luncheon Monday, William H. Fitzpatrick of the New Orleans States, New Orleans newspaper, spoke on the United Nations and constitutional law. He pointed out that a treaty supercedes all American law and said that some United Nations proceedings might come in conflict with that provision. His talk was very interesting.

Two New Committees

Following the election of officers, President Simons announced that two additional overall committees would be formed, one under R. C. Jordan, vice president, Minneapolis, to supervise the chairmen of the committees of technical nature; and another under Art Hess, Los Angeles, to supervise the committees dealing with membership relations.

It was also announced at this session that an amendment increasing the dues had been passed.

A silver tray was presented to the outgoing president, Paul B. Christensen; also Dan Wile was presented with the Wolverine award and T. J. Lopiccolo received the award for the best section paper.

Elaborating on a policy adopted a few years ago of providing for more informal discussions, the Program Committee arranged, for the New Orleans meeting, four conferences or symposiums with lead off papers by experts followed by discussions and questions from the floor. These conferences, three of which were held concurrently with the regular technical sessions, were devoted to Low Temperature Applications, The Use of Alternate or Substitute Materials, Packaged Air Conditioning, and Industrial Insulation Applications. From the attendance at these sessions and the discussions that ensued, it is evident that the decision of the Program Committee is a popular one and will be followed at subsequent conventions.

Probably the most controversial paper presented at the meeting was the one on the Construction, Operation and Test Results of the Calibrated Room Calorimeter, for testing room air conditioners. This device, specified by ASRE Standard 16-R, adopted in December 1949, has been objected to by a number of manufacturers for various reasons. Consequently, ASRE Council decided to authorize the Standards Committee to review the Standard for the purpose of possibly effecting a revision of it.

The Council also authorized the appointment of a Committee to make a thorough study of the quarterly publication, Refrigeration Abstracts, to determine its actual cost to the Society and its effective use by the profession in promoting the art and science of the Refrigeration Industry. This Committee will be headed by Past President C. F. Holske, New York, Eastern Sales Manager, Vilter Manufacturing Company.

The next meeting of the Society will be held in June 1952 at the Biltmore Hotel in Atlanta, Georgia, and the next winter meeting at the Hotel Commodore, New York City in December of that year.

New Officers and Directors

President, Edward Simons, San Francisco.

Vice-Presidents, R. C. Jordan, Minneapolis, Minn.; A. J. Hess, Los Angeles, Calif.

Treasurer, D. K. Tressler, Bridgeport, Conn.

Directors: D. D. Wile, Los Angeles, Calif.; W. A. Kuenzli, Cincinnati, Ohio; John Lambert, York, Pa.; J. R. Hornaday, Muskegon Heights, Mich.; H. C. Diehl, Colorado Springs, Colo.; Howard Peterson, Yakima, Wash.

Opening Session

The first session was held Monday morning and was devoted primarily to low temperature in the form of a symposium.

T. J. Lopiccolo, vice president of Bowser Technical Refrigeration, discussed low temperature, particularly as applying to desiccation of various materials by means of ultra low temperature combined with vacuum. This process goes under the name of Lyophilization. He mentioned that it has three particular characteristics.

(1) It is especially useful in desiccation of materials that cannot be heated, such as blood plasma and the antibiotics, penicillin, etc., and this also applies to certain other drugs and even foods.

(2) It leaves a porous structure that facilitates the re-absorption of the water when the water is to be added and the material put back to use.

(3) By this means, it is possible to reduce the moisture content to practically zero. The moisture content refers only to the free water and not to water in hydraulic or other "bound" water.

The speaker said that in order for this method to be successful, especialy with the antibiotics, it is necessary to use a —80 to —100 F temperature for the cold trap, and that it is necessary to reduce the vacuum to at least one micron.

M.I.T. Laboratories

Prof. S. C. Collins of M.I.T., said it was particularly appropriate that this discussion be held in New Orleans where almost exactly one hundred years ago, Dr. Gorrie pioneered in the use of the old dense air principle with a machine for making ice and cooling rooms. Mr. Collins' discussion related particularly to the laboratories in M.I.T. in which by use of the dense air method, liquefaction is produced of such gases as helium, nitrogen, etc. They produce all of the liquid nitrogen that is used in the M.I.T. laboratories, which is used in the lyophilization process or other low temperature experimental work at a cost of about thirty thousand dollars a year.

Liquid nitrogen, he said, is made directly by allowing compressed ni-

trogen gas, which is then cooled by water, to expand into what he terms "expanders." These consist of small pistons and cylinders attached to water-cooled brakes. The energy to operate is taken from the nitrogen gas and it is directly reduced to liquid nitrogen at —300 F. Helium gas is compressed, cooled first with water and then with liquid nitrogen, and then led into the expanders, removing the heat further to allow the gaseous helium to turn directly into liquid helium at —462 F. Their equipment has a capacity of 25 litres of liquid helium per hour.

Aeronautical Test Laboratory

C. S. Moore of the Lewis Aeronautical Test Laboratory, described their very large engine testing laboratory in which they have installed an 18,000 hp engine, and in this equipment they have refrigeration of 17,000 tons capacity. They use 30 tons of Freon-12 by weight. They cool 100 pounds of outside air per minute down to —41 degrees dewpoint and then dry it further by passing it through activated alumina. This air is then used in the carburetor of the engine.

Engine Test Facilities

A. A. Brown of Pratt and Whitney, described the engine test facilities at the Pratt and Whitney plant involving six systems using three different types of compressors, reciprocating, rotary and centrifugal. This equipment is so arranged that they can produce temperatures up to 100 and down to —160 and —170 F. Although their equipment is much smaller than at the Lewis Laboratory, Mr. Brown thought it was more suitable for their purpose and more flexible.

Refrigeration System Of Eastman Kodak

J. H. Shaw of Eastman Kodak described their rather large refrigerating system which cools brine to —85 F. and this brine is then used throughout their plant. The chief use of the brine is the recovery of solvents used in the manufacture of photographic film. The capacity of the refrigerating system is 1500 tons, consisting of a number of Freon-12 machines, and the brine is methylene chloride, which is refrigerated to and circulated at —85 F. There are 195,000 gallons of the brine and it is circulated at the rate of 7,000 gallons per minute. The cost of the system was 1½ million dollars.

They attempted to clean this system by means of live steam, then flushing with methyl alcohol, but made the mistake of assuming that it would not be necessary to remove all the methyl alcohol residue. They found a great deal of moisture was left in the system and they are attempting to dry it out by the "batch method." In this method they remove a quantity of the brine from the system and pass it through desiccants — then back into the system. They have been doing this for some months and have the alcohol content down to .77 percent and the moisture content down to .008 percent; and they would like to reduce it further to .007 percent.

Insulation Conference

A conference on insulating materials and methods of applying them was presented by insulation users in different fields of application. They discussed the limitations of specific insulations with emphasis on the importance of excluding moisture to produce long, effective life. Several participants described new methods and rather new materials they had employed in this field.

The speakers included a paper by Nils R. Bernz of Merchants Refrigerating Co., read by Paul B. Christensen, on the factors in selection of insulation; a paper with slides by Mr. Breiby of Oscar Mayer & Co., Madison, Wis., on the insulation installed in a new warehouse; a paper by D. L. McIntyre, technical adviser for the American Society of Bakery Engineers, who discussed the type of insulation suitable for use in freezer rooms and reach-in coolers; a paper by J. V. Grubbs, who classified insulation as of three types, experimental, temporary and permanent; a paper by C. W. Kniffen who described the Elgin Air Force base hangar; a paper by R. H. Langer, chief engineer of the Miller Brewing Co., Milwaukee, who described the method used in applying insulation; a paper by E. R. Hallowell, chief engineer of Snell Refrigeration Supply, Dallas, who described the insulation in the Alford Warehouse at Dallas.

New High Pressure Relief Valve

A new high pressure relief valve was described by M. W. Garland, chief engineer, Frick Co. This valve employs metal seat construction and is suitable for use with both Freon-12 and ammonia refrigerants. He described the unique features incorporated in the design of this new type valve.

Specific and Latent Heat of Foods

H. E. Staph, University of Texas, gave a technical review of experimental work that has been conducted at the University of Texas in determining the specific and latent heats of foods. He brought out that the latent heat of frozen foods is almost directly proportional to their water content. He also brought out that although water freezes at a constant temperature, food does not do so and that what we call the freezing point of food, is actually the temperature at which the food starts to freeze. As soon as it starts to freeze, some of the water is turned into ice, leaving a more concentrated solution of water and the other content of the food, and this more concentrated solution freezes at a lower temperature until finally all of the free water is frozen out; thus, a food may not be solidly frozen at 10 or 15 degrees below the point at which it starts to freeze.

This condition is also true on thawing. If, for example, we have a frozen food at —40 F and we add heat, the thaw point gradually rises and all of the food may not be entirely thawed until the temperature is almost up to 32 F. He pointed out also that the fusion point of a food, that is, the point at which the food starts to freeze, is roughly proportional to the water content. He mentioned that the specific heat of water is 1.0 at about 32 F and of ice in the nearby range is .51, but that at —40 the specific heat of ice is .40.

Refrigerator Cars

Wilbur T. Pentzer of the United States Department of Agriculture, discussed "Refrigerator Car Developments." Approximately 35 million tons of perishable foods, he said, are transported per year and this represents 1,800,000 carloads which are carried by the present supply of 126,000 refrigerator cars; 47 percent of these are devoted to the transportation of fruits and vegetables, ½ of 1 percent to frozen foods; 21 percent to canned foods; and 15 percent to meats. The remainder are devoted to transportation of such foods as potatoes and other semi-perishable foods. He mentioned that transportation of potatoes involves 255,000 carloads; citrus foods, 93,000 carloads; bananas, 87,000 carloads; and lettuce, 74,000 carloads.

Of the 126,000 total refrigerator cars, 37,000 are equipped with fans of the centrifugal type in which there are seven fans, 7½ inches in diame-

ter and having a capacity of 10,000 cfm at 35 miles per hour at each end of the car. They have a few new type cars, having three propeller type fans mounted at the top of each of the ice bunker bulkheads. It costs $500 to equip a refrigerator car with the centrifugal type fans. The United States has 175 refrigerator cars equipped with overhead bunkers which are quite common in Canada, which has 3,000 of these cars. The United States also has 1,000 cars built for frozen foods, that is, with ice and salt. There are less than 200 mechanically refrigerated cars at present but their number is growing.

Mr. Pentzer showed some curves indicating transcontinental temperatures, using various type cars. He then showed a chart of an end bunker car with ice and salt which was able to maintain only 10 F across country. These are the kind the railroad claims are sufficient for frozen foods, but this was rejected by Mr. Pentzer and two or three in the audience. The chart showed that Diesel electric cars were able to maintain zero temperature in the car across country. Mr. Pentzer mentioned that of the 126,000 refrigerator cars available for use today, 90,000 are suitable for fruits and vegetables and of these 60,000 are the new type having the heavier insulation. He mentioned also that it cost $10,000 to build one of the new type end bunker well-insulated refrigerator cars.

Temperature Measurements

Professor B. J. Luyet, St. Louis University, described methods of detecting and recording very rapid temperature changes in the order of several hundred degrees per second. Slides were used to show the methods employed in making instantaneous temperature measurements, of value to research work.

Sterilizing Foods By Atomic Radiation

A report was presented by L. E. Brownell of the University of Michigan on the possibility of sterilizing foods by atomic radiation. The method employed was to use Cobolt 60 isotope, which was in turn produced at very low expense (and probably is a by-product from the atomic industry). This experiment is in its early stages, but it was brought out that the method does have possibilities of preserving foods by destroying bacteria and molds and to a lesser extent, reducing enzyme activities.

The work has certain hazards and a shield of seven inches of lead was employed. Not too much is known about the possible hazards of using the foods so treated. Some of them become quite discolored and uninviting in appearance. The glass containers of some foods are radically changed, clear glass changing to brown. It was mentioned, however, that this method holds certain possibilities in the preservation of certain types of biologicals. The speaker mentioned that this treatment was not to be confused with some of the earlier attempts to control bacteria with ultra-violet light. Ultra-violet light affects only the surface of the foods; x-rays penetrate only about ½ inch and are prohibitively expensive.

Calibrated Room Calorimeter

Fred O. Urban, General Electric Co. described the calibrated room calorimeter, recently built by his company, under the new 16R Standard of the American Society of Refrigeration Engineers. It is a two compartment type in which the room air conditioner is installed in the wall dividing the two compartments. The amount of heat going into the room conditioner is then measured and compared with the measured amount of cooling done in the other compartment, and it was brought out that the Standard 16R required that these two must agree between 94 and 104 percent.

He showed some slides that indicated how close this ratio of heat balance between the two rooms was, and incidentally these slides also show some wide variation in capacity of some of the various room conditioners, particularly in the ½ hp size, and this variation was true even among like size conditioners of the same manufacturer. Discussion which followed indicated that many manufacturers do not like the test code.

Heat Flow Studies

The study of heat flow in complex wall structures presents problems that can be side-stepped by studying the flow of electricity in analagous systems. Professor Carl F. Kayan, Columbia University, reported the results of his further studies in this field. He pointed out that the methods being followed were indicated by researchers a number of years ago but have not been generally utilized especially in the analysis of equipment such as heat exchangers and condensers. Typical heat exchangers were described and their heat flow analyzed by the direct and the analagous electrical methods.

Material Supplies

The Domestic Refrigerator Engineering conference studied the present shortage of many materials and sought alternates to replace some of the materials in short supply. John Willard, Aluminum Company of America, said there just is not enough aluminum to meet all demands but expanded production is expected to satisfy these demands by late 1952.

Domestic production of the primary metal should be 1,650,000,000 pounds for 1951, which is 200 million pounds over 1950. However, scrap recovery is down. Government orders have interfered with normal scrap return. Also the government cut scrap prices one-half and the ceiling on scrap prices, so scrap is not being turned in in quantities, as it was last year. Also imports in 1951 were much below 1950. That is, they dropped from 353 million pounds down to about 250 million pounds. From this, it will appear that the total aluminum production for 1951 will be about the same as for 1950. Government stock piling and government orders have been greater than 1950 and, as a consequence, civilian supply has been heavily reduced.

The government has authorized a considerable increase in the aluminum industries primary smelting capacity. Approximately 1.3 billion pounds will be added, bringing the total to 2.8 billion. This increase will be privately financed. If increased production facilities proceed on schedule, 1952 should show a production of about 2 billion pounds which is 10 percent greater than the peak production during World War II. Mr. Willard said the increase in 1953 should be greater than 1952 and that 1954 should be even greater, that is, up to about 3 billion pounds, which is approximately ten times production in 1939. There can be of course no predicting how much of the increased production will be used for government purposes, but probably the present shortage will be relieved and possibly cured by late 1952.

He added that 95 percent of the planned increase can be done on an economical production basis, thus giving foundation to a wider use of aluminum, for future civilian purposes. He mentioned that aluminum is the most plentiful of all metals, that 1/12 of the earth's crust is aluminum. Refining methods are somewhat expensive compared to iron and steel as they are entirely dependent upon the availability of electric power, which is the only bottleneck to an almost unlimited expansion of aluminum production.

Use of Plastics

William C. Wall of Du Pont mentioned the general classification of plastics, the thermo-setting which may be likened to concrete in that after it once sets, it never returns to a softer form. The other type is the thermo-plastic, which may be likened to steel in that it may return to a softer form by application of heat.

At present the success of plastics, that is the development of their uses and the expansion of production facilities, depends upon the support given its use by the automotive industry. Many new plastics are being developed and he mentioned that nylon, although it is generally thought of as being used exclusively for stockings, and other articles of wear, is used also as bearing material—valve seats, gears and other working parts. He showed colored slides of various parts made of plastics.

Copper Production

M. F. Meissner of Western Brass Co. stated that the government has issued certificates of necessity to increase copper production 200 thousand pounds per year, and that th ECA may increase another 150 thousand pounds and Anaconda will add 50 thousand pounds. The present shortage is about 400 thousand pounds per year. It is estimated that by 1954, production will be enough for military and civilian use, short of all-out war. He stressed the point that the shortage is due to lack of production facilities, and not to unavailability of copper ore, since there is more known copper ore in the ground now than has ever been known previously.

During the discussion following this talk, the question was asked as to the annual use of copper and the answer was that in 1950, total production was 1,500,000 tons. J. R. Hornaday of Norge pointed out that the refrigeration industry finds it difficult to shift from copper to substitutes due to the fact that the industry is not familiar with the fabrication of aluminum and that the cost of plastic molds has been so high as to cause users to avoid plastics.

Packaged Air Conditioners

The conference on packaged air conditioners was opened with a study of the past growth and the expectations of the future in this field by William Henderson, Air Conditioning and Refrigerating Machinery Association. He showed that production in about ten years had grown to about 250,000 units annually.

Important in this great increase, Mr. Henderson said is the excellent engineering progress that has resulted in smaller units with greater capacity and continually better operating results. By basic value comparisons, he showed how the costs had also been reduced. Future markets of very large volume were forecast for this section of the industry.

Design of Air Conditioners

Paul Moore of the York Corp. discussed design problems of room air conditioners which he said could be divided into two classifications: (1) mechanical design, which involves the selection and design of coils, compressor and other component parts to do a given job and meet industry standards at competitive prices (2) creation of sales features as to appeal, usefulness, and appearance.

He pointed out that excessive disassembly for maintenance and service may permanently damage the usefulness of the unit, increase noise and air losses. It was noted that he did not include quality and reliability, but he felt that these were something that must be taken for granted and are generally assumed by the buyer and must be provided by any responsible manufacturer. The designer should make the unit's design flexible or provide several types to meet various needs so as to relieve the installer of the necessity of improvising in the field sometimes with bad results.

Window Air Conditioners

Ralph Gonzalez of Air-Temp discussed the subject of window air conditioners. He reviewed their past history which he said first started about 1937 or 1938. Since that time the trend has been toward the sealed unit at full motor speed. The narrow depth and vertical arrangement of the so-called store cooler was first selected for maximum ease of installation in the space to be cooled. The first mass production of these was in the 3 hp size, which were 19½ inches deep in order to allow the cooler to line up with cases and furniture and drug and clothing stores.

Discussing sizes, he said the place allowed it by the user was ordinarily so small that it was unlikely that the manufacturer would make his unit too small. He mentioned that the use of Freon-22 with its smaller compressor displacement, 3500 rpm compressors, better heat transfer methods, etc., are factors that may be used in reducing size. The upper limit of size, he said, is 30 inches wide and 6 ft. 6 in. high to pass through a standard door.

The store cooler, he added, must be reasonably neat and this, in itself, will encourage volume.

Residence Cooling

W. A. Grant of Carrier Corp. discussed "Residential Equipment." He spoke of the prospects for year-around air conditioning for residences. He emphasized that we should forget the old standard of 70 F in winter and 80 F in summer and go to 75 F and 50 percent relative humidity the year around. He pointed out that the low relative humidity tends to reduce odor. Factors involved are low noise level and area to locate the unit. He felt that the manufacturer must offer a wide range of types of equipment for all parts of the country and for various types of building construction.

G. E. May of the New Orleans Public Service Company said he felt that 110-220 volt service would soon be standard for all residences. Due to the more widespread use of electric ranges, window air conditioners and other equipment involving heavy electrical load, 110-220 service is desirable. He felt that there should be a very strong effort to promote 220 volt for any motor over ½ hp wherever it might be located. He noted an increasing use of 3 phase and felt that this was desirable and that it should be used on all motors 3 hp and above.

Refrigeration Insulation

AN ACCEPTABLE addition to current literature on cold storage insulation is a technical monograph on "Refrigeration Insulation" published by "Modern Refrigeration" on behalf of The Institute of Refrigeration. The author is G. Yate Pitts, M.Eng., M.Inst.R.

The subject heads indicate the practical range and serviceable nature of this short textbook: thermal conductivity; moisture absorption; heat flow; cellular structures; insulated construction; frost-heave; solar radiation; selection of insulant; precautions with concrete; use of aphalt; airlocks; tables; appendix.

In order to place this information within easy reach of the largest number of readers—students and otherwise—this monograph has been produced, with a limp cover, at the low price of 7s.6d. ($1.05) per copy.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

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THIS MONTH IN BRIEF

The annual review of the refrigerated warehousing industry shows a good year in 1951 with occupancy up over last year and a very favorable outlook for 1952, with demand for storage space continuing.

In cooperation with representatives from the N.A.R.W. office, a group of Baltimore warehousemen were hosts to a group of prominent government men. The day was used for a detailed inspection of the three refrigerated warehouses in Baltimore.

With all members present, a meeting of the executive committee of the National Association of Refrigerated Warehouses was held in Chicago. Action was taken on a number of important industry problems.

Cold storage holdings for November 30 showed a slight decrease in cooler space over October 31 but freezer space raised the national level to 84 percent. The annual compilation of cold storage holdings in general showed an increase over the year before.

Refrigerated Warehouses Have Good Year in 1951—Outlook For Next Year Is Optimistic

THE year 1951 was a good year for refrigerated warehousemen, with precentage of occupancy up for both coolers and freezers, and the outlook for 1952 is favorable. This survey is a compilation of reports from leading members of the industry from representative sections of the country, as an annual feature of ICE AND REFRIGERATION.

Next year the demand for storage space is expected to continue, backed by the government's need and use of space, and continued activity in general business conditions. This means another year of high occupancy, it is expected, especially of freezer space, which could be increased to advantage in some sections.

Principal commodities stored remain about the same, with satisfactory increases in frozen foods, and a now storage commodity, wet cell automobile batteries, offering promise of providing a profitable item for some houses. The government storage program has developed a considerable storage-in-transit business, which has added to the overall volume.

Other possible items of new business are the air conditioned storage of candy, and storage of new plastics or plastic compounds, reported from Houston, Texas.

Again this year the spread between operating costs and profits has narrowed, but additional gross volume has taken up part of this and enabled the net income to remain on a satisfactory level. Nevertheless some fears are expressed in some quarters that the net profit, percentagewise may show a decline unless some measures of relief are obtained in the form of increased rates. This condition is aggravated by the constant agitations by labor for wage increases, a situation which many think might start general business on an economic decline, in spite of the high production of war goods.

Percentage of Occupancy

SPACE occupancy during 1951 was up considerably over 1950 in most instances, and this trend is expected to continue well into 1952. Increased turnover at one warehouse brought higher labor costs and a drop in longer-time storage. One factor which is expected to affect occupancy in 1952 will be the government's storage program which, as of now, probably will be accelerated.

A warehouse operator in Boise, Idaho reports almost 100 percent occupancy during most of 1951, compared to about 80 percent in 1950. For 1952 there is expected to be some variation as dairy men in that section do not seem to need storage space at present. Expected occupancy is estimated at 75 to 100 percent.

Occupancy of a Chicago warehouse in 1951 was slightly higher than in 1950. In all this company's plants, they found the demand for freezer space under considerable pressure and they were consequently making more conversions of cooler space to lower temperatures. In 1952 also they expect to have a new plant in service and that will give considerable relief. They anticipate no difficulty in full utilization of its capacity.

A New Orleans warehouse reports that their occupancy for 1951 was slightly above that of 1950, and for 1952 they expect a similar increase.

Another New Orleans warehouse reports space occupancy of 100 percent in the freezer (zero and lower temperature) and the cooler approximately 90 percent occupied. This occupancy for 1951 is about 10 percent higher than it was in 1950. They expect for the first six months of 1952 that coolers and freezers will be approximately 90 percent full. They express no prediction as to what will happen in the last six months of 1952.

From Boston comes word that 1951 was a year of high occupancy of freezer space, occasioned by increased storage of frozen foods and by more than usual storage of one or two products not normally stored in such

quantities. The defense program had the effect of creating an abnormal demand by vendors for freezing facilities for those engaged in fabricating meats under army contracts. Facilities were enlarged to meet this demand.

A Detroit Warehouse operator reports that business in 1951 was about the same as 1950, which was about 80 percent occupancy.

From where they sit, according to a Minneapolis warehouse, 1952 will follow closely that of 1951 and occupancy is expected to be about the same. It might be better if the shell egg owners like the picture next spring. They didn't like it last year. Apple storage was light this year, it too might be better next year, however, future controls policy will have a lot of influence on all commodities. They think one situation will offset another unless there is a "hot war."

From St. Louis comes a report that occupancy compared quite favorably with 1950 and a comparable increase for 1952 is anticipated.

A Cincinnati warehouse reports 1951 occupancy 25 percent larger than that of 1950 and if the army continues its meat purchasing program, the occupancy should be still larger in 1952.

Cleveland, like most sections of the country, experienced another busy year in refrigerated warehouses. This was especially true of freezer occupancy. During the major part of the year, most of the warehouses have enjoyed close to capacity business.

Another warehouse in Ohio reports a good year in 1921 and expects this favorable trend to continue well into 1952.

In Philadelphia the percentage of occupancy in 1951 was approximately 25 percent greater than in 1950, and from present indications, it is believed 1952 will be still greater—at least 10 percent—than 1951.

Occupancy in Nashville, Tenn., for 1951 was about 5 percent above 1950, and regarding the future, their best guess is that a high level will continue.

A Houston, Texas warehouse reports that during 1951 they considerably enlarged their refrigerated space and that there was a much larger freezer occupancy but that the reverse was true as regards cooler occupancy.

A Salt Lake City operator reports a gain in occupancy of one percent over last year. There was a light activity the first six months but the last six months the warehouse was full.

A Milwaukee operator reports that 1951 occupancy was the same as 1950. Turnover however was noticeably more rapid, thereby entailing a greater labor cost and less "long pull" storage revenue. For next year he expects tonnage volume to be about the same, but with increased costs.

Principal Commodities

THE principal commodities listed in this survey include frozen foods, other processed foods, dairy products, farm products in general, seafoods, packing house products, cheese, and vegetables. Of all these, frozen foods shows the greater tendency toward an increase. The volume of cheese for next year, according to one report, appears unpredictable, with an erratic tendency.

In Boise, Idaho the principal commodities stored are processed foods, dairy products, other farm products, and frozen foods.

A variety of commodities are stored in Detroit, and there were none in particularly large volume, in this respect being about the same as 1950.

In New Orleans, seafoods of all kinds, packing house products, cheese, and vegetables are stored, along with a considerable number of other commodities. All except cheese showed an increase over last year and all are expected to increase during 1952, although the cheese market right now seems very erratic.

One of the larger New Orleans warehouses received about 50 percent more frozen foods and vegetables in 1951 compared with 1950. They expect this volume to increase during 1952.

Frozen foods are the principal commodity stored by an Ohio warehouse. This volume was about 25 percent greater than in 1950 and prospects for 1952 look very favorable.

In cooler space, says a Cleveland warehouseman, there was considerable carry-over the start of the year from previous year's holdings. The continued growth and consequent demand for additional storage of quick frozen fruits and vegetables, as well as the fruit concentrates, has affected that section to a great degree. As a matter of fact cerain houses are already laying plans for a further conversion from coolers to freezers. Bearing in mind that Cleveland contains more refrigerated warehouse space per capita than any consuming center, he thinks they are most fortunate in enjoying this volume of business.

A Philadelphia warehouse reports that while they store almost everything in the line of perishable foodstuffs, the bulk of their business is frozen foods, including fruits, juices, vegetables, meats, poultry, and fish, and this accounted for the increase in volume.

Cheese is the largest cooler storage item in Nashville, Tenn. with meat, frozen eggs, frozen strawberries making up the bulk of freezer storage. Strawberries were up in tonnage due to a very heavy although short season crop. The rest of the items mentioned were up proportionately with the increased occpancy. They are expecting storage requirements of these products to hold rather steady.

A Houston, Texas warehouseman says that if the present trend continues they expect to have a larger demand for freezer space than they ever had before.

Frozen Foods

FROZEN foods continue to move into and out of storage at an increased rate, although the tempo slowed down slightly in 1951. Some houses report an increase while others say the volume was about the same. A gradual increase is expected for 1952.

A Boise, Idaho warehouseman says they received an appreciable volume of frozen foods in 1951. This has been increasing for several years, and the tendency is expected to continue during 1952.

The volume of frozen foods stored in Detroit, according to one warehouseman there, was about the same as in 1950.

Contrary to the general trend, a warehouse in New Orleans reports only a small volume of frozen foods received for storage, although there was no decrease from 1950.

In Milwaukee, frozen foods in storage showed an increase over 1950.

A Philadelphia warehouse received an appreciable volume of frozen foods, in fact their frozen food storage increases every year and they look for a still greater volume in 1952. This company has kept steadily ahead of the demand for freezer space in that area and has spent probably upwards of a million dollars in the last ten years adding new space, reconditioning old space, and converting cooler space to freezer. They are now completing the installation of three floors in an old ice storage house and this will add materially to the capacity.

Strawberries made up the heavy part of frozen foods storage in Nashville, Tenn. If there is a large inmovement of orange juice to go with the berries, there should be an increase during 1952. If not, about the same.

At Houston, Texas a large volume of freezer holdings was of frozen foods and a still larger volume is expected for 1952.

New Storage Commodities

ABOUT the only new storage commodity reported during 1951 was wet cell automobile batteries. Some houses expect this to develop into worthwhile space occupancy, based upon research now under way. Other possible new business, not particularly important in 1951, but which may have some possibilities for 1952, include storage-in-transit and providing facilities for the chemical industries in some sections. The air conditioned storage of candy and

storage of new plastics or plastic compounds is reported from Houston, Texas.

From Boise, Idaho the report is that nothing is known of any new storage commodities of refrigerated warehousing services that could be developed there. At Nampa and Pocatello a considerable storage-in-transit business has been developed and it is expected that the chemical industry in Idaho may require considerable refrigeration.

A Detroit warehouseman points out that the Refrigeration Research Foundation has assumed the duty and responsibility of developing new storage commodities and that these researches have been effective.

A Toledo warehouseman and others reported recent new business in the storage of new wet cell automobile batteries. Some battery companies are now conducting studies on the most effective temperatures and humidities for storage and it is expected that this will mean new and profitable business for a number of warehouses.

A New Orleans warehouse expresses the belief that the storage of automobile batteries can be developed for the summer months. They are now working with a firm at present for the storage of a large quantity, approximately ten carloads, storage to begin during the month of April. At present this development depends on whether or not they will have space available at that time for this new business.

A New Orleans warehouseman advises that except for sharp freeze facilities he knows of no new techniques nor lines in the industry.

From St. Louis the report is that they have not been able to come up with any new products in volume that would increase earnings. While the demand for cooler space is diminishing, it would appear that this decrease could be offset partially by increased demand for freezer commodities, except for the fact that the present day high cost of conversion presents an effective obstacle.

From a Cleveland warehouse comes a report that there has been some storage of wet-cell batteries carried on this year, some using zero temperatures, others in the 32-33 F range. The manufacturers are making tests of the life of these batteries after removal. If this proves a success, there is the potential of a large storage volume of this new item. Many of the houses are also handling increased volumes of candies under controlled temperatures. This business has been growing steadily over the years with considerable success. As a matter of fact, a great demand has been created for a 45 F temperature on these candies, and with the evaporated milk producers increasing their demand for this temperature, it appears that the future will bring greater demand for the 45 F. temperature than the 30 to 33 F temperatures used in the storage of shell eggs that are rapidly passing out of the storage picture.

A Houston, Texas warehouse has developed a large volume of business in air conditioned storage of candy at 65 to 70 F. They have also found that a considerable amount of new plastics or plastic compounds need refrigerated storage and they have developed a considerable amount of this business.

Costs and Income

COSTS of doing business were up again from last year, including materials and supplies and wages which, with a static tariff, still further narrowed the spread between expenses and net profits. This was true for most warehouses, although there were a few who were able to hold their costs about on a level with last year. Some wishful thinking is expressed that some relief might be obtained through the OPS of increased handling and storage charges to offset these constantly increasing costs, although this raises a problem as to whether higher rates might not lead some customers to provide ways and means of providing their own storage space.

Boise, Idaho reports that costs were in line with income, but as the dollar goes down in purchasing power, costs go up in dollars.

In Detroit, costs were up considerably because of increases in prices of all new materials and supplies, and rising wages for labor.

The 1951 gross income of a Chicago company increased measurably, but there was a paralleling increase in expenses, not only in labor, but in supplies and materials required for operation. The consequence was a slight reduction in gross operating margin, but the result on the last line of the P & L statement was further reduced by a very substantial increase in federal taxes on income. Commodity storage in 1951 showed substantial increase of receipts of meat and frozen foods in all plants. There was also a substantial increase in frozen foods.

In New Orleans, costs were pretty much in line compared to income during 1951. They held the line on labor and kept other costs pretty much the same.

Costs of another New Orleans warehouse have been in line with income as in previous years. However, the costs are increasing and since rates have not been increased for about two years, it may be necessary for them to make some adjustment.

A Boston warehouse reports that costs continued to rise, with little hope of maintaining their normal relation to income under the present controlled economy.

Refrigerated Warehousing

A Minnesota warehouseman thinks another round of wage increases is in sight. If this comes to pass, they must have a rate increase. All in that area are now absorbing the last increase as it was made in February and rates were frozen as of January tariffs. When they close their fiscal year, their profits per share of stock will be under what they were a year ago. This is understandable with all operative costs increasing from month to month. High efficiency can not keep up with them.

In St. Louis, operating costs, including labor, for 1951 increased appreciably, which was reflected in the net profit, and they were expecting continued reduction in the net profit on 1952 operations, unless relief is obtained from OPS in the form of permission to increase storage and handling charges to offset the higher labor rates demanded.

In Cincinnati, costs were far greater than in 1950 and previous years.

From Philadelphia, a warehouse reports that their payroll is approximately 65 percent of the total expense and it has been rising steadily, but by using additional mechanical equipment and issuing new tariffs, when necessary, they have been able to operate on a fairly satisfactory basis.

There is only one direction for costs —up, according to a Nashville, Tenn., operator. Their increased revenue and a sound mechanical handling program offset this upward trend in 1951 however.

The costs, reports a Utah warehouseman were much higher in 1951 than the year before and previous years.

Costs in Texas were very favorably in line with previous years in relation to net profit compared to gross operating income.

In Milwaukee, costs were continuing to rise constantly, yet no changes in the tariff were possible during 1951 because of the OPS freeze on warehouse rates.

Important Problems

NO NEW problems appear to have injected themselves during the year. Increased costs of labor and a fluctuating labor supply appears to be the Number One headache to most operators. Conversion of cooler into freezer space, almost a necessity to meet the influx of low temperature commodities, poses a problem of how to do this and still expect an adequate financial return, with costs of materials and labor as they are.

Boise, Idaho reports their most outstanding problem in 1951 was labor, but that there wasn't much they could do about it. It is plentiful in the winter and scarce in the summer.

Refrigerated Warehousing

A Chicago warehouseman says the outstanding effect felt in 1951 and which will dominate the income of industry members in 1952 is the confiscatory federal income and excess profits taxes. The rates have gone so high that if it were not for the habit which they all have of trying to do the best they can under any circumstances, there would be little incentive to make any effort.

New Orleans reports that their most important problem was how to make a profit from all the hard work necessary to operate a refrigerated warehouse.

An outstanding problem of 1951, as reported by a Cincinnati warehouse, was how to find sufficient freezer space to take care of the additional volume.

A Philadelphia warehouseman says he believes warehousemen should keep in frequent contact with their customers, and attempt to anticipate their requirements. They should make sure proper service is provided at all times, and that the customers pay for the service they require. While rates should be held to a minimum, they should be sufficient to make the operation profitable.

A Nashville warehouse operator reports that they have encountered no unusual problems this past year outside the normal ones that occur in a cold storage operation. The confiscatory trend in taxes and the inflated price of all the things they have to buy are problems sure enough, but they are unable to do anything about them.

A Milwaukee warehouseman says they regard constantly rising truck drivers' and warehouse workers' pay as the major factor which will adversely affect future business. Cartage costs have become a substantial item to customers, he says, and in their efforts to reduce this cost, these customers show a tendency to handle more "quick turnover" merchandise through their own warehouses.

Building Better Business

WITH space occupancy on a satisfactory basis during 1951, no new specific ideas seem to have been developed to point toward building better business or bigger volume. Looking beyond 1952, which is expected to bring continued satisfactory occupancy, general suggestions include careful attention to annual conventions of the National Association of Refrigerated Warehouses and to the research work of the Refrigeration Research Foundation. Continued good service as a sound basis of public acceptance and, thinking of the future, holding down costs also are cited as necessities.

Boise, Idaho offers a suggestion that warehousemen would do well to provide better service, both in storage and delivery, and to maintain their prices if possible, without any advances. For the long range it is suggested that the outlook is very uncertain and caution should be used until it is known how far down the dollar is going.

In the opinion of a New Orleans warehouseman, all warehousemen should work to get more closely with their trade and research organizations to do a better job of selling their services and their techniques to the public and to their customers. For the long range, he fears that the big problem for small plants,—those that are not backed by big money or a chain of some sort, is one of survival. Between taxes, labor, and inflated costs, he says, it is getting to be just that—a question of survival.

A Minnesota Warehouseman thinks the industry is in a healthy state, yet all could do more business. They do need more volume if they are to make respectable profits. High occupancy with a good turnover means volume and this they must have, he says, if wages rise and rates continue frozen. It is senseless to argue otherwise. The industry's research work is very helpful to the industry. In "Dutch" Diehl, he says, they have an outstanding leader in science and "know how." He looks for more commodities coming to refrigerated warehousing as research findings are made known to prospective customers. The National Association, he continues, is doing a tremendous job too. At Washington they have real leadership. Jerry Johnson and "Bill" Dalton constitute a team hard to beat.

He suggests that the industry interest the activities of the National Federation of Independent Business in its behalf. They are championing the small business man in particular. He thinks of refrigerated warehousemen as coming under this category in the American Way of Life, and he knows of others in the industry who think well of this group in political influence. "If we aren't alert in Washington, we are lost in the shuffle. We are fortunate in our association set-up with its many high geared committeemen of the industry. We cannot overlook a salute to them whoever and wherever they are," he concludes.

Continuing to render patrons the best possible service is offered by an Ohio warehouse operator as basis for a program of better business and bigger volume.

From a Texas warehouse the opinion is expressed that education of the general public regarding the functions of refrigerated warehouses undoubtedly could improve the industry's position; education of the volume storers as to costs, problems, and services.

A Milwaukee operator calls attention to press reports which indicate that the steel unions may succeed in getting a large increase in wages. If so, this will be a signal to the other unions of the nation to go on an all-out drive for similar increases. Such increases, in the face of much lower labor costs in Japan and the European countries, who must export to the United States to establish a balanced economy of their own, will gradually bring on unemployment here and a resulting depressed economy. He says he is fearful that this coming year may see a start on the road to economic decline, in spite of the huge manufacture of war goods. Under these circumstances, he thinks it behooves the executives and the unions in the warehousing industry to use more than merely normal caution to hold down costs as much as possible so that the shock the country may be called upon to face within the near future can be absorbed with less difficulty.

The Outlook for 1952

THE outlook for 1952 is favorable, tempered by the thought that in these changing times no one can foretell exactly what even the immediate future may unfold. For instance, the shifting of commodities such as decreases in some and decreases in others, leaves a question. But the probable government storage program and expected continued business prosperity are factors of such stability as to assure, with reasonable certainty, a favorable outlook. One unfavorable factor however is rising costs and the question as to whether increased rates, if obtainable, would be the desired answer to that problem.

A warehouseman in Idaho says the outlook there is that both warehousing and business in general will be very busy during 1952, due to the government's expected accelerated program for that year.

A Chicago warehouseman says they expect that eggs, both shell and frozen, will show increases. They believe there will be further increase in the volume of storage of frozen foods and larger quantities of meat for storage. Warehouses in strategic position, either from local market conditions or because of their transit advantage in the traffic pattern, should enjoy all the business next year that they can handle, he concluded.

A Utah operator reports that prospects for 1952 are good.

From New Orleans comes a report that the outlook for the refrigerated warehousing business for 1952 is good; not very profitable, but sound and solid in the long view.

Another New Orleans warehouse expressed the belief that the cold storage business and the warehousing business in general have very good

(Continued on page 59)

Executive Committee NARW Overhauls Current and Future Program

WITH all members present, a meeting of the Executive Committee, National Association of Refrigerated Warehouses was held at the Drake Hotel, Chicago November 15 and 16. A major item on the agenda for the meeting was a blueprint covering possible future association activity. The analysis, known as "Operation Future," was a presentation which the Executive Committee had asked the NARW staff to prepare.

Activities Analyzed

In the presentation, association activities and finances were thoroughly analyzed, and a projection was made of possible future expansion in the association's program of activity. The Executive Committee is conscious of its responsibility for future progress, as well as for the present stability of the association, and it was for this reason, principally, that the study was made.

The entire membership of the Committee was present including J. P. Johnson, A. B. Efroymson, C. E. Simmon, G. F. Dodson, R. M. Connor, H. C. Emerson, H. A. Gross, C. B. Hart, W. C. Hudlow Jr., T. E. McCrary, F. D. Newell Jr., W. W. Wilson Jr., J. L. Gagini, and Wm. Dalton.

New Members

Other business of the meeting included discussion of the names of 11 applicants for NARW active membership. Seven of the applications were formally accepted as follows:

Continental Freezers of Illinois, Inc., Chicago, Ill.

Independent Ice and Cold Storage Co., Inc., Shreveport, La.

Canada Cold Storage Company, Ltd., Montreal, Quebec

Cosby Cold Storage Company, Inc., Olean, New York

Mercury Cold Storage Corp., Inc., Chicago, Illinois

National Freezers, Inc., Miami, Florida

Red Hook Cold Storage Company, Inc., Red Hook, N. Y.

The balance of the applications had been submitted by a member company in Denmark, who recently opened four branch warehouses in various cities. The Committee voted that these firms are to be admitted to membership upon satisfactory completion of a routine business investigation.

Membership Promotion

Membership building and promotion was discussed at some length. It was agreed that an expanded drive should be organized by the membership, the Executive Committee, and the Association staff, to bring into the NARW as many as possible of the very small percentage of public refrigerated warehousemen not now members of the association. A special drive for associate members was advocated. It was emphasized that many companies representing allied industries have found it of considerable value and advantage to be formally identified with the membership of NARW. Moreover, it has been found that public warehousemen themselves profit from the opportunity of establishing stronger working relationships with such industries as are eligible for associate membership in NARW.

Attention was given to the subject of increasing the scope and effectiveness of associate membership displays at the annual NARW convention. The association office was instructed to determine approximately what might be wanted by the associate members in the way of facilities for convention displays. NARW would then undertake to satisfy these wants to the best of its ability.

The question of designing an NARW seal—a project long contemplated by many members of the association — was brought before the Committee. As a preliminary measure to further discussion, the Executive Office has been asked to solicit ideas for such a seal, and the propriety of exhibiting such special identification.

The committee voted to reaffirm its recent vote of confidence in the activities of the Legislative Committee and took the occassion to restate its policy on legislative matters.

NARW President Johnson made a detailed report on the activities of the All Industry Frozen Food Committee in connection with the annual frozen food convention to be held next March 2 through 7 at the Conrad Hilton Hotel, Chicago. Because of the fact that NARW will be an active program participant in this affair for the first time, it was decided that the Association's identity should be more formally established in the minds of the convention delegates. For that reason it has been agreed that a display room will be set up in the hotel to serve as industry headquarters for refrigerated warehousemen and their guests during the frozen food show.

Convention Program

Convention programming occupied the attention of the Committee at some length. The following specific recommendations were made: (a) All program offerings should be of an audience participation type and should be organized in the form of panels, forums, and round table discussions, with leaders and participants making only brief remarks on an individual basis; (b) There shall be no speeches; (c) The Refrigeration Research Foundation is to be invited to participate in NARW's convention by conducting a half-day session on Tuesday, May 6, such session to conform as closely as possible to the general policy on audience participation.

Training Conferences

Training conferences which have been sponsored in the past by NARW and The Refrigeration Research Foundation jointly, were discussed. It was unanimously agreed that reestablishment of these conferences should take place at an early date.

Special commendation was extended by the Committee to NARW's Emergency Plans Committee in recognition of that committee's untiring efforts to coordinate the activities of the warehousing industry with action undertaken by the military establishments and government departments in connection with the new form of government warehousing contract recently formalized at a government-sponsored meeting held in St. Louis.

The Committee voted to hold its next regular meeting just prior to the annual convention which is scheduled to be held in New Orleans next May 4 through 8.

The Executive Office was formally congratulated by the Executive Committee on the loyalty, progressiveness, and success of their efforts in serving the refrigerated warehousing industry and the members of NARW.

A special committee was appointed to conduct research in those phases of the Bankruptcy Act which pertain to the lien rights of warehousemen. Recent litigation, posing a threat to the lien rights extended to warehousemen, has been deemed sufficiently important to warrant this special survey.

Joint Chapter Meeting Hears Needs For Enlarged Refrigerated Space

A JOINT meeting of the Great Lakes Chapter, the New Jersey State Association and the North Atlantic Chapter of the National Association of Refrigerated Warehouses was held at the Belmont Plaza Hotel, New York City, December 10 and 11, 1951.

Seventy-five warehousemen attended the two-day meeting which was officially opened by Jerry P. Johnson, N.A.C. Chairman and N.A.R.W. President, Monday morning, December 10. The sessions on Monday morning were highlighted by excellent presentations offered by Dr. H. C. Diehl, Director of Refrigeration Research Foundation, and William L. Dalton, Executive Vice-President of the N.A.R.W., Washington, D. C.

Dr. Diehl said that intensive studies of the characteristics of perishable commodities including many in forms that were purely experimental only a few years ago have vastly enlarged the potential of the nation's refrigerated warehouse system. He said that entire new fields of products,—a number of them non-foods, are being opened up to the industry as more is learned of how the factors of controlled temperature and controlled humidity can add to their economic value.

He emphasized that many of the foundation's projects are planned in cooperation with interested industries and often were jointly financed. Dr. Diehl cited as one of the results of such joint study the birth of the frozen shrimp industry. He mentioned that during the course of the survey, the cause of "black spot" was determined.

Earlier, in an address of welcome, Jerry P. Johnson, president of the National Association of Refrigerated Warehouses, pointed to the growth of the entire frozen food industry since the end of the war and the concurrent expansion of refrigerated warehousing.

He declared that research was now being conducted into new variations of well known products to devise more efficient methods of marketing. One of these, frozen concentrate of milk, he admitted, is a leaf from the book of the frozen citrus industry. If the study project comes up with satisfactory results, he indicated, it may be the occasion of considerable changes in the distribution and use of milk.

William Dalton, executive vice-president of the National Association of Refrigerated Warehouses, described the modern concept of the industry as not just "renting out space," but rather offering customers the benefits of a thorough knowledge of the products to be stored. The growing trend toward refrigerated storage of non-food products is taking in many items as patent leather and even cartridge spaces, he said.

Panel Discussion

Following luncheon, a panel discussion of significant importance on the subject "Refrigerated Warehousing in the Defense Program" was presented by: Paul D. Burrill, Quincy Market Cold Storage Co., Boston, Mass.; Col. Harold Boston, Storage Division, Office of Price Stabilization, Washington, D. C. and Harold K. Osgood, Warehouse & Storage Division, Defense Transport Administration, Washington, D. C.

Mr. Osgood told the delegates the agency is studying potential warehouse requirements for many years to come. DTA, which has the power of allocation of public warehouse space, is not now contemplating such procedures, he declared. Where additional space is required in certain areas the agency is offering tax amortization incentives in an effort to expand facilities, Mr. Osgood said.

A cocktail party and dinner added the final touch to the days proceedings.

Second Session

Harry Foster, Great Lakes Chapter Chairman, presided over the session held Tuesday morning, December 11. Subjects of considerable interest to all warehousemen were discussed with a great deal of interest, with practically everyone in attendance participating.

Following luncheon on Tuesday, the two-day meeting was brought to a close after an election of the North Atlantic Chapter Officers and Executive Committee Members for the ensuing year. Those elected to serve were:

Chairman, C. Bartlett Eddy, Merchants Cold Storage & Warehouse Co., Providence, R. I.

Vice-chairman, Carleton B. Peacock, Quaker City Cold Storage Co., Inc., Philadelphia, Pa.

Secretary, Raymond Tuller Jr., Springfield Cold Storage, Springfield, Mass.

Treasurer, A. W. Oakley, Hudson Refrigerating Co., Jersey City, N. J.

Executive Committee: John J. Byrne, Manhattan Refrigerating Co., New York, N. Y.; Richard Doncaster, Holley Cold Storage Co., Holley, N. Y.

Fatal Results from Maintenance Operation

LIQUID ammonia that spilled out in a strainer cleaning operation resulted in fatal asphyxiation of Walter Weidman, Chicago. He was assigned to clean a 4 inch strainer and observers reported that he had removed all the bolts from the cap before it was loosened. The operation was carried on in a room held at —20 F and when the cap came off several ounces of liquid ammonia spilled out on the clothing of Mr. Weidman.

He was asphyxiated and all attempts to revive him failed. Associates in analyzing the occurrence pointed out that it is standard procedure when opening any system to leave two loosened bolts in place on opposite sides of the cap, flange or plate. Then the joint is opened, followed by removal of the last bolts and the cap. These precautions are observed primarily because all pressure may not be off the system until it is opened.

In this particular case it is reported that no pressure remained in the lines but the low temperature caused a pocket of liquid ammonia to remain in the strainer. Mr. Weidman, 64, had been in refrigeration work for 30 years. He was employed by the Burge Ice Machine Co. on the installation work in the new warehouse of Continental Freezers of Illinois, Inc., Chicago.

Injury Frequency Rates Refrigerated Warehouses

INJURY frequency rate in refrigerated warehouses according to a survey just completed by the U. S. Department of Labor is 39.7 per million employee hours worked. This is the highest rate in the warehousing industry according to the survey which covered 2,695 public warehouses of all types. Average for the whole warehousing industry was 31. Household goods warehouses showed the low rate of 21. The severity rate for injuries in refrigerated warehouses was 1.6 compared with 2.2 for all warehouses. In the occupational groups coolermen showed the highest injury frequency rate of 85.9.

November 30 Cold Storage Holdings

UTILIZATION of public cooler space on November 30 was 67 percent—a decrease of 2 points since the end of October. The seasonal decline was average for this time of year but was greater than the net change reported a year ago.

Current utilization of cooler storage space was 3 percentage points below the November 30 5-year average and 4 points below the occupancy level on November 30, 1950.

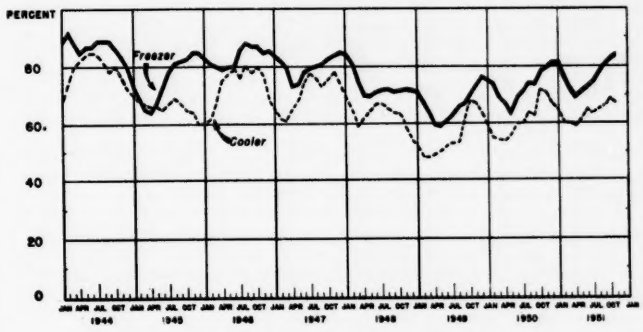
Seasonal increases in use of freezer storage space raised the national level to 84 percent which compares with 79 percent reported last year. Freezer space was better than 85 percent filled in all regions except the West North Central, West South Central, and Pacific regions. Citywise, freezer space appeared to be tight in Buffalo, Philadelphia, Pittsburgh, Cleveland, Chicago, Detroit, Minneapolis, Baltimore, Norfolk, Memphis, Seattle, Los Angeles, and San Francisco.

Cooler-held foodstuffs declined 3 percent during November to 2.7 billion pounds. Commodity-wise, net decreases in weights of fresh fruits, nuts, cheese, shell and dried eggs countered the seasonal net increase in storage weights of other cooler-held items such as meats, dried and evaporated fruits, and canned fruits and vegetables.

Total freezer weights reflected a net November gain of 2 percent, and by the end of the month totaled 2.2 billion pounds. Poultry and meat products accounted for all of the net increases in freezer storage weights as holdings of fruits, vegetables, cream, butter, and frozen eggs reflected net seasonal decreases during November.

The total national weight of foodstuffs in storage—4.9 billion pounds compares with 5.3 billion in storage last year and 4.6 billion in store November 30 during the 5-year period ended 1950.

Fresh apples in storage November 30 amounted to 28 million bushels as compared with 40 million in store a year earlier and average November 30 holdings of 33 million bushels.



Occupancy of Refrigerated Warehouses 1944-1951

Holdings of pears were reduced to 2 million bushels by November 30 which were about average for this time of year.

The greatest net changes were reported in holdings of strawberries and cherries with reduction of 10 and 17 million pounds, respectively. Although the national frozen fruit total was about average for this time of year, holdings of blueberries, cherries, and strawberries were above

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Nov. 30, 1951	Oct. 31, 1951	Nov. 30, 1950	Five-year Average
Meat and meat products, lbs.	697,180	499,293	545,098	507,139
Lard and rendered pork fat, lbs.	32,720	31,344	57,794	57,725
Frozen poultry, lbs.	308,366	259,920	269,640	265,352
Creamery butter, lbs.	59,990	94,611	159,873	87,604
American cheese, lbs.	204,842	229,561	233,733	156,413
Other cheese, lbs.	18,618	21,131	20,338	21,464
Shell eggs, cases	232	527	61	659
Frozen eggs, lbs.	93,662	121,592	75,582	116,954
Apples, bu.	27,744	28,375	40,032	32,895
Frozen fruits, lbs.	354,172	379,207	354,242	354,986
Frozen vegetables, lbs.	525,223	554,175	454,011	364,394
Frozen fish, lbs.	178,600	171,924	165,394	156,542

Frozen fruits were also about average for this time of year with 354 million pounds reported in storage. November net seasonal withdrawals of 25 million pounds, however, were almost twice the average November change and were about 3 times the net withdrawals last year.

their respective 5-year average levels on November 30. Frozen orange concentrate stocks were reduced from 13 to 11 million gallons during November, while holdings of other frozen juices and purees increased from 64 to 67 million pounds during the same period.

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Nov. 30, 1951 (%)		Oct. 31, 1951 (%)		Nov. 30, 1950 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	2,972	5,936	50	91	55	93	71	77	63	79
Middle Atlantic	32,978	30,640	68	87	70	87	74	87	71	83
East North Central	28,967	23,783	64	87	72	84	72	79	71	78
West North Central	8,565	14,044	61	77	67	71	77	76	75	77
South Atlantic	8,907	6,811	71	90	69	87	62	69	65	74
East South Central	2,766	3,246	84	89	85	88	78	84	73	82
West South Central	6,828	7,316	58	65	60	65	59	61	65	70
Mountain	1,521	2,480	61	92	60	86	68	83	65	80
Pacific	14,344	22,226	75	80	64	87	65	79	72	78
United States	107,848	116,482	67	84	69	83	71	79	70	79

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent				Net Piling Space (000 Cu. Ft.)		Space Occupied			
			Nov. 30, 1951		Oct. 31, 1951				Nov. 30, 1951		Oct. 31, 1951	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	7	16	56	81	50	89	61		82			
Middle Atlantic	1,077	1,787	63	89	65	88	1,398	218	59	92	65	83
East North Central	6,427	5,037	86	62	69	46	2,852	657	85	80	79	79
West North Central	231	1,218	90	63	81	81	6,924	3,333	87	77	90	64
South Atlantic	500	3,037	84	53	84	68	645	115	82	100	87	100
East South Central							67	64	100	86	47	38
West South Central	143	69	92	100	76	91	400	76	100	100	100	100
Mountain	106	41	92	68	91	98	514	424	97	100	89	98
Pacific	5,402	2,940	29	77	28	83	1,654	349	100	100	90	88
United States	13,892	14,145	62	67	54	70	14,516	5,237	86	82	86	71

NOTE:—Blank spaces indicate that insufficient returns were received.

Frozen vegetable holdings once again reached an all-time high as 525 million pounds were reported on hand November 30. These holdings were 16 percent greater than last year's supply and 44 percent greater than average for this time of year. Notwithstanding record holdings, November net withdrawals were also the largest ever recorded for this time of year—29 million pounds. Last year the November decline was only 4 million pounds while the average change was 7 million pounds. Green peas reflected a seasonal decrease of approximately 20 million pounds; snap beans, 9 million; lima beans, 8 million. Only Brussels sprouts, broccoli, cauliflower, spinach, and unclassified frozen vegetables showed seasonal net increase in November storage holdings.

National holdings of fluid and plastic cream amounted to 24 million pounds on November 30 which compares with 10 million in store last year and 35 million on hand November 30 from 1946 to 1950.

November 30 holdings of creamery butter were only a little more than a third of the amount in store last year with 60 million pounds reported on hand. During the month, net withdrawals amounted to 35 million pounds as compared with 48 million reported last year and a 26 million pound average November net withdrawal. More than three-fifths of the national holdings were in the East and West North Central storages, the latter held almost 20 million pounds.

American Cheddar cheese stocks were reduced by 25 million pounds during November and by the end of the month totaled 205 million pounds. This compares with 234 million in store a year ago and 156 million on hand November 30 during the 1946-50 period. Last month's stocks were second only to the record November 30 holdings reported last year.

Shell egg holdings declined to 232,000 cases by the end of last month, while frozen egg holdings were reduced by 28 million pounds leaving 94 million in storage by the end of November.

Greater than average November seasonal increases in poultry stocks brought the national total to 308 million pounds. Last month's gain of 48 million pounds was 7 million pounds greater than average but 4 million pounds less than the increase last year. Turkey stocks increased 24 million pounds during November to total 107 million pounds which compares with 108 million in store last year. A 17 million pound net gain in holdings of fowl raised national holdings to 101 million pounds. Slight gains were also reported in holdings of broilers, fryers, and roasters.

The net increase in holdings of beef during November was almost twice the average for this time of year (52 million vs. 27 million) and by the end of the month stocks amounted to 177 million pounds. Pork holdings, likewise, increased by greater than average amounts during November to a total of 402 million pounds which compares with 326 million in store last year and average November 30 holdings of 290 million pounds. Frozen pork stock of 188 million pounds were about four-fifths greater than average for this time of year. Holdings of lard and rendered pork fat showed only a slight gain during November, increasing approximately a million pounds to 33 million pounds.

Frozen fishery products in storage November 30 increased to 179 million pounds while cured fishery stocks decreased to 26 million pounds. Total holdings of all fish in storage were approximately the same as those of a month earlier—205 million pounds.

Storage Outlook

Cooler occupancy declined during November in accordance with the seasonal pattern and in the magnitude indicated by the 5-year average pattern—2 points. Further seasonal declines are expected during December and if the average change prevails again, coolers may be as much as 4 points below the occupancy level reported November 30. On the other hand, freezer utilization should continue to increase during December and by the end of the month occupancy may be as high as 85 percent, which would be comparable to the level reported Dec. 31, 1947 and 1945.

Captive Moose Thrive On Refrigerated Leaves

THE Wisconsin Cold Storage Co., Milwaukee, Wis., Philip Kuehn, reports an interesting new product for refrigerated storage.

The Milwaukee zoo recently acquired two young moose from Canada, and is now carrying on a cooperative study on storage of fresh leaf cuttings of oak, maple, willow and dogwood to be used to feed the animals. Tests showed that these cuttings stored well at zero but not at 32 F. The zoo will draw out rations daily and will continue the experiment as long as it works out well. At the first feedings, the moose seemed to eat the frozen chow with pleasure. Experts believe they would die without such food.

Turkey Freezing and Storage Research

FOR a study of freezing and freezer storage of turkeys recently, experimental packs of over 800 pounds of Toms and almost 1,000 pounds of hens were prepared and stored at Fresno, Calif. The work is a project of The Refrigeration Research Foundation in cooperation with Fresno Consumers Ice Co., and the Cudahy Packing Co.

Variables include scaling temperature and time, chilling method, evisceration vs. New York dressing. Western Regional Research Laboratory workers will examine samples at intervals of 3, 6 and 9 months. The Institute of American Poultry Industries is also cooperating.

Annual Report on ColdStorage Holdings

THE volume of chief commodities stored in refrigerated warehouses during 1951, 1950 and 1949, also the 1946-50 five-year average is shown in the following tables, compiled from monthly reports by the Production and Marketing Administration of the U. S. Department of Agriculture. Generally, these figures show increased occupancy, although some products were down from last year. Meats, frozen fruits, frozen vegetables, apples and frozen fish registered increases while frozen poultry, creamery butter, American cheese and shell eggs declined. Frozen meats and frozen fish especially showed substantial increases for each month during 1951, while creamery butter showed a decrease for each month except December.

TABLE I. FROZEN BEEF, PORK, LAMB AND MUTTON (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	790,874	769,708	762,887	700,585
Jan. 31	959,886	849,825	888,551	830,812
Feb. 28	917,774	815,578	903,050	837,358
Mar. 31	905,946	778,415	860,785	804,812
Apr. 30	892,153	749,314	791,409	745,338
May 31	839,262	673,868	672,798	671,607
June 30	778,413	633,160	612,391	616,369
July 31	700,943	542,713	547,201	553,812
Aug. 31	605,151	466,263	451,368	453,921
Sept. 30	521,665	410,280	362,050	355,219
Oct. 31	498,183	404,740	370,408	362,586
Nov. 30	697,180	545,098	492,509	507,139

Frozen meat showed a substantial increase for each month over last year, also the year before and the five year average.

TABLE II. FROZEN POULTRY (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	281,601	281,972	160,834	288,661
Jan. 31	284,623	295,736	148,418	283,707
Feb. 28	242,023	260,523	131,496	258,989
Mar. 31	192,913	212,058	108,732	217,809
Apr. 30	147,203	167,000	89,205	174,942
May 31	125,359	136,548	77,823	145,997
June 30	112,369	122,328	74,733	128,346
July 31	106,692	103,367	71,261	123,857
Aug. 31	121,493	105,179	83,466	133,408
Sept. 30	166,242	140,352	132,380	154,317
Oct. 30	258,810	217,999	211,517	224,603
Nov. 30	308,366	269,640	267,508	265,352

Frozen poultry showed a decrease over last year, the first seven months, but a slight increase the last five months but as compared to the year before each month registered an increase.

TABLE III. CREAMERY BUTTER (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	105,364	105,192	33,615	150,456
Jan. 31	75,329	103,657	18,737	37,230
Feb. 28	52,507	92,886	8,718	27,675
Mar. 31	33,378	93,489	6,318	25,206
Apr. 30	32,207	109,020	15,338	30,411
May 31	42,590	136,867	51,056	50,172
June 30	72,598	185,167	102,701	88,443
July 31	104,405	230,063	136,786	120,550
Aug. 31	116,790	239,398	153,855	132,844
Sept. 30	113,501	234,111	154,455	126,652
Oct. 31	94,812	208,228	144,819	113,634
Nov. 30	59,990	159,873	130,452	87,694

Creamery butter showed a considerable decrease over last year for every month except December. Compared to the year before there was an increase the first five months and a decrease the last seven months.

TABLE IV. AMERICAN CHEESE (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	188,519	187,157	126,534	126,032
Jan. 31	155,117	159,906	116,779	113,421
Feb. 28	137,397	149,004	111,073	102,071
Mar. 31	130,655	141,946	105,608	96,840
Apr. 30	144,441	153,135	109,920	103,351
May 31	169,553	186,062	117,021	120,473
June 30	204,009	229,785	140,859	150,299
July 31	227,199	256,395	162,346	171,869
Aug. 31	233,788	287,977	183,208	190,596
Sept. 30	239,500	292,421	188,259	190,773
Oct. 31	227,985	276,930	185,839	176,589
Nov. 30	204,842	233,733	175,764	156,413

American cheese also showed a decrease over last year for every month after December but compared to the year before there was an increase each month.

TABLE V. SHELL EGGS (000 CASES)

	1951	1950	1949	5-year average 1946–50
Dec. 31	26	34	250	269
Jan. 31	76	380	152	272
Feb. 28	159	735	144	610
Mar. 31	309	1,296	530	1,454
Apr. 30	973	2,147	954	2,872
May 31	2,083	3,412	1,943	4,479
June 30	2,427	3,667	2,290	5,140
July 31	2,270	3,163	1,936	4,886
Aug. 31	1,615	2,568	1,426	4,074
Sept. 30	958	1,558	810	2,840
Oct. 31	513	502	501	1,618
Nov. 30	232	461	250	659

Shell eggs continued unstabilized, with decreases over last year for each month except the last two and a considerable decrease each month compared to the five-year average.

TABLE VI. FROZEN EGGS (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	48,655	47,310	104,932	105,778
Jan. 31	31,157	55,052	71,532	88,308
Feb. 28	32,712	73,159	58,621	88,782
Mar. 31	62,298	116,546	77,319	117,110
Apr. 30	109,253	155,108	107,058	162,434
May 31	162,659	179,732	141,361	203,440
June 30	189,980	188,476	166,582	224,832
July 31	190,818	174,761	168,394	220,440
Aug. 31	176,273	155,369	146,868	201,272
Sept. 30	151,293	133,002	121,476	175,890
Oct. 31	119,885	104,378	96,382	145,647
Nov. 30	93,662	75,582	72,556	116,954

Frozen eggs decreased considerably the first six months, but showed an increase the last six months compared to last year. Compared to the five-year average, there was a decrease every month.

TABLE VII. FROZEN FRUITS (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	446,377	449,989	335,940	370,460
Jan. 31	431,711	279,255	317,695	348,405
Feb. 28	408,361	265,204	301,249	326,192
Mar. 31	245,331	251,119	266,581	297,649
Apr. 30	207,764	150,915	237,419	223,548
May 31	218,103	167,709	237,856	225,555
June 30	256,863	217,255	255,787	251,748
July 31	317,755	280,400	327,090	319,907
Aug. 31	380,264	333,030	339,588	358,573
Sept. 30	387,929	338,074	355,552	360,999
Oct. 31	384,323	363,602	342,565	368,465
Nov. 30	354,172	479,353	326,934	354,986

Frozen fruits showed an increase for all but the months, December, March and November.

TABLE VIII. FROZEN VEGETABLES (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	425,279	425,170	281,825	293,778
Jan. 31	375,269	339,316	262,047	269,808
Feb. 28	328,520	305,316	229,506	242,861
Mar. 31	294,223	269,980	206,061	219,233
Apr. 30	272,111	241,992	269,980	199,570
May 31	270,206	221,119	186,821	188,754
June 30	290,321	235,955	219,515	212,877
July 31	369,311	283,334	237,847	252,207
Aug. 31	445,724	361,366	315,788	311,095
Sept. 30	515,766	430,576	368,552	356,359
Oct. 31	549,019	457,573	387,681	371,193
Nov. 30	525,223	454,011	383,658	364,394

Frozen vegetables increased each month over last year and a considerable increase also for each month over the year before and the five-year average.

TABLE IX. APPLES (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	33,561	33,621	17,813	23,536
Jan. 31	27,273	19,573	12,971	17,245
Feb. 28	20,135	12,502	9,028	11,470
Mar. 31	12,891	7,074	5,491	6,785
Apr. 30	6,931	3,645	3,318	3,462
May 31	2,844	1,289	1,294	1,323
June 30	680	165	343	
July 31	294	115	175	
Aug. 31	293	102	412	
Sept. 30	7,684	7,321	14,777	9,480
Oct. 31	26,271	34,451	35,224	31,677
Nov. 30	27,744	40,032	33,405	32,895

Apples showed an increase for each, except the first and last two months over last year, an increase the first eight months and decrease the last four over the previous year. Generally this same condition prevailed compared to the five-year average; an increase the first eight months and a decrease the last eight months.

TABLE X. FROZEN FISH (000 POUNDS)

	1951	1950	1949	5-year average 1946–50
Dec. 31	158,809	157,722	150,974	144,928
Jan. 31	130,880	125,516	127,635	121,595
Feb. 28	106,834	105,818	104,138	99,488
Mar. 31	96,367	87,133	82,722	81,821
Apr. 30	88,803	79,027	88,615	73,551
May 31	105,944	97,773	91,453	87,857
June 30	127,351	116,897	114,031	103,886
July 31	181,251	137,307	127,217	125,889
Aug. 31	161,628	182,356	146,344	172,472
Sept. 30	166,100	158,473	150,608	146,439
Oct. 31	171,424	166,105	156,077	151,970
Nov. 30	178,600	165,394	158,719	156,542

Frozen fish held firm throughout the year, showing an increase for each of the twelve months except August over last year, the heaviest increases being noted in the months of June and July; and an increase for each month over the previous year. Compared to the five-year average also an increase was shown for each month of the year.

Ice Plant Adds Refrigerated Storage

WITH the opening of what is believed to be the first refrigerated warehouse in Morris County, the 70-year old firm of J. C. Dalrymple Inc. in Dover, N. J., continues to make sure that its customers have the most modern facilities in refrigeration.

The assorted group of buildings just off Center Grove road not only provide an interesting variety of refrigeration and heating systems but also an assortment of frozen products. There are three frozen moose there at the present time. There are a few deer frozen solid but when the deer season opens in New Jersey the number is likely to come close to a hundred.

Three Freezer Floors

The new warehouse, which is located in center rear of the group of buildings, consists of three floors, all 40 by 40 ft. and all held at five degrees below zero. Already there are long rows of frozen turkeys, some packages of cut-up chickens and a cornerful of frozen ice cream.

Most of the articles stored there at the present time have been brought in by families who will store them there until needed. The Dalrymples have always catered to family trade. First it was natural ice delivered to residents of the neighborhood. Then manufactured ice because Mother Nature was not entirely dependable. That is still a large portion of the business.

Then they build a room of frozen food lockers where families can store food until needed. Now the big warehouse provides a huge storage space where families can bring larger quantities of produce for keeping until needed. Actually the largest room of all in the establishment is for storing apples in boxes. That room is kept around 32 F.

Other Temperatures

The range of activities also extends into far higher temperatures. A retail store, including both groceries and meats is operated at the plant. That is at normal temperatures. Then there is an aging room for meat. And finally, at the highest temperature, is a smoking room, where hams, bacon, etc. are smoked over hickory sawdust. The firm preserves meat both by cooling and heating.

The 100-acre farm on which the plant is located has been in the family for well over a hundred years. There was a small pond on it that John Dalrymple used as his personal ice supply. But it was not until 1880 that it was turned into a commercial venture by James B. Dalrymple, grandfather of the three brothers now operating it.

The original storage house was located in the kitchen of the homestead which was built in 1823 on the site of the present large home. The room was situated in the center of the house and was well insulated. The old homestead was later moved.

The first step in the expansion program of which the new warehouse is the latest, was construction of a 500-ton storage house. Then in 1888, a 12-acre pond was built and the storing facilities enlarged to 1,500 tons. By 1923, the old one-horse wagon delivery system was replaced by motor trucks that carried ice to families, markets and hotels in Dover, Rockaway and Wharton.

Ice Manufacture Started in 1932

Freakish weather during the winter of 1932, when there was not enough sustained cold to freeze ice in the pond led to the start of the manufactured ice business. Now, during the summer, 300 pound cakes are made daily and stored, although consumption about equals production during that period. The other developments have come since then.

John Charles Dalrymple followed James B. in the family succession of the firm. Now his four sons operate the business with Robert I. as president; Carl E. as vice-president; Augustus "Gus" H. as treasurer and James R. "Roy" as manager.

Pallett Dolly Has Advantages For Moving Goods in Storage

A PALLET dolly has succeeded very well in refrigerated storage operations in a number of plants in California. Reed Smith, manager of the Oakland, Calif. plant of National Ice & Cold Storage Co. worked with the Roll-Rite Corp. of Oakland in the development of this new dolly. Following tests with other models and sizes Roll-Rite has applied for a patent covering the design and principle of operation.

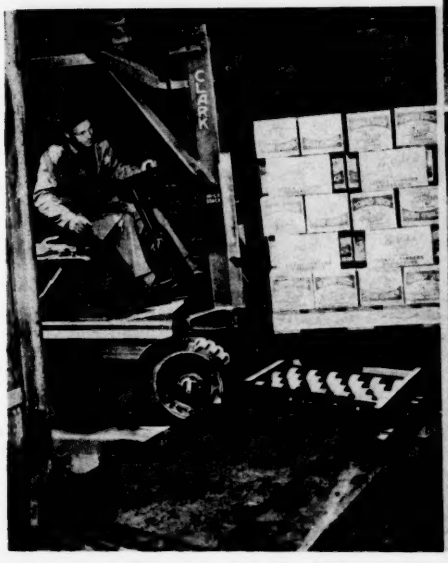
Its advantages are maneuverability, ease of operation, and suitability for use on truck and reefer floors. The 24 wheels in the central portion (see above picture) are placed slightly lower than the wheels at the ends. The wheels at the ends are held in position by springs, which allow them to move on their axles as the load is guided to its destination. The difference in height of center and end wheels permits a certain amount of rocking motion which aids in movement and guidance of the pallet load. That is, the tilting effect allows the dolly to turn, and the center wheels (on off-set axles) prevent lodging of wheels in slatted floors.

Overall dimensions are 40 inches in length by 30 inches in width. Slight variations can be made, with regard to size, if necessary. The frame is forged steel channel with 4.5-inch vertical section. The 24 center wheels are 6x2 inches in size, rubber-tired, with ball bearings, and are located in tandem fashion with axles off-set. The end wheels are 6x2 inches in size, have hard treads, and are spaced on spring-loaded axles.

In loading a car or truck the dolly is placed near the opening and the fork truck places the pallet load on it. Then it is moved quickly and easily to a convenient position for unloading. The reverse procedure is used in unloading. A crew of four can use two dollies conveniently. Although no elaborate data on time-saving have been obtained, it has been possible to unload a 34,000 pound load in 45 minutes.

The dolly upended to show under mechanism.

The dolly in operation 1—In position on a ramp ready to be loaded with pallet load of frozen foods. 2—Two pallet loads being moved in doorway of refrigerator car. 3—This crew is using two dollies for handling pallet loads in refrigerated truck.



Clinics Will Highlight Program of The Annual Fact Finding Conference

AT THE opening session of the Fact Finding Conference, to be staged by the Institute of American Poultry Industries in Kansas City, Mo. February 10, 11 and 12, Congressman Harold D. Cooley, chairman of the House Agriculture Committee, will be interviewed by representatives of poultry publications and radio farm editors.

Congressman Cooley, from North Carolina, and five reporters from the poultry trade press and radio will open the Industry-Government Clinic Sunday afternoon, February 10, with this "Congress Meets the Poultry Press" panel.

"This approach," explained Edward Priebe, Jr., chairman of the Institute's board of directors, "has been popular with the general public on radio and TV, and we know it will attract a lot of interest at the Fact Finding Conference. Particularly since the poultry industry's growth has naturally stepped up our concern with Congressional policies and legislative action."

Other Speakers

Other speakers taking part in the Industry-Government Clinic Sunday afternoon include Clif C. Warren of the PMA Poultry Branch, who will use the best "clues" available to track down the possibilities and probabilities for next year's chicken, turkey and egg crops—and show how rapid changes in industry patterns can throw even the most expert forecasters off the scent; Colonel C. F. Kearney, head of the Quartermaster Market Center System, who will talk over the growing volume of chicken, turkey and egg products needed by the military forces—particularly in 1952—and some of the problems involved in making military contracts work satisfactorily from both QMC's view and industry's; George L. Mehrens, head of the OPS Food and Restaurant Division and top man on poultry and egg price regulations, who will explain OPS policies and plans as they affect chicken, turkey and egg operations.

Joseph O. Parker, legal counsel for the Institute, will wind up the Industry-Government Clinic with a background picture of the five leading government agencies which serve or regulate certain phases of poultry and egg operations.

The Shell Egg and Egg Products Clinic scheduled for Monday morning, February 11, will feature the consumer education work one state 4-H group is carrying on as part of its quality egg project; a new "clean egg" plan a West Coast firm is using to reduce losses caused by spoilage in washed eggs; how good state laws, properly enforced, lend needed support to quality egg programs; an analysis of confusing and conflicting reports on how milling or churning affects the final performance of commercially frozen egg whites in cakes and other foods; and specifications for frozen egg whites that live up to the requirements of the baking industry.

Production and Procurement

Highlights of the Production and Procurement Clinic Monday afternoon, February 11, include a 3-way panel on breeding and feeding broilers for top consumer acceptance; a 3-way discussion of the progress being made in breeding hens that will lay eggs with better built-in quality; the latest developments in producing and merchandising small turkeys; a "design for better living" for broilers, based on fitting the house and furniture to the needs of the individual operation, which may vary according to size, climate, budget, and other factors; and how to make a control program for Newcastle disease produce the best results.

The seven speakers on the Plant Operating Clinic Tuesday morning, February 12, will present facts and figures successful operators need to know about producing, hatching and processing costs, taxes, by-products, sanitation and scalding temperatures.

National authorities in the field of advertising and marketing will headline the Merchandising Clinic Tuesday afternoon, covering the fundamentals of successful merchandising, the trend toward plant cartoning in quality egg merchandising, the role training schools are playing in developing improved retailing methods, and the story behind the increasing popularity of canned poultry products.

"As always," commented Cliff Carpenter, president of the Institute, "there won't be a lot of spare time left after folks take in the program and see all the equipment, supplies and services on display in the exhibit hall. But they'll have a good chance to do some after-hours relaxing at the Institute's open house Sunday evening and the banquet Monday evening. And there's an extra special treat coming up for Institute members at the membership breakfast Sunday morning."

Frozen Apple Juice Offers New Storage Commodity

THE report of the concentrated apple juice committee appointed in the state of Washington well over a year ago, to sponsor studies on industrial feasibility of frozen concentrate, is now getting publicity. Conclusions reached were that frozen concentrate is a practical outlet for poorly colored and small apples: that a practical method is available and costs are low enough to meet competition; that use of a large portion of Delicious variety is possible and that the consumer tests were encouraging. Chairman of the committee is Reuben G. Benz, Yakima, Wash.

The method referred to is the one developed in the Western Regional Research Laboratory, Albany, Calif. The flavor-preference and consumer-acceptance studies were conducted by the Washington Experiment Station and the United States Department of Agriculture Bureau of Agricultural Economics. This method makes a four-fold concentrate. Essence is removed before, and added back after, concentration. At the Eastern Regional Research Laboratory, Wyndmoor (suburb of Philadelphia) Pa., a method for a seven-fold concentrate of apple juice has been studied and information on it available. According to the report, this concentrate, when reconstituted with water, makes a juice equivalent to a good single-strength apple juice but not so nearly like the fresh juice as that obtainable by the four-fold process. A storage temperature of 35 F is said to be adequate for a year for the seven-fold concentrate.

Norment New Chairman Terminal Refrigerating

CLARENCE F. NORMENT has been elected chairman of the board and first vice-president of Terminal Refrigerating & Warehousing Corp., Washington, D. C. He succeeds the late William M. Hannay. Walter Truland, Arlington, was elected as a new director.

Mr. Norment has been vice chairman and a director of the warehousing firm for many years. He is also a vice president and director of the National Bank of Washington. He served as president of the former Norfolk & Washington Steamboat Co. for about 20 years.

Ceiling Height for Mechanized Handling In Refrigerated Storage Rooms

A PRELIMINARY survey on the most suitable height of ceilings in refrigerated storage rooms for mechanized handling has been made by the Refrigeration Research Foundation. Selected excerpts from the replies are given below:

"Our selection of ceiling height is based on the cannery lug. It can be stacked to 24 boxes if it has a corner post, otherwise 21 boxes is the limit. The use of 21-boxes-high has an added advantage in that many palletized loads are 7 boxes high. We use 3 pallets 7 boxes high in our newest rooms, which require 19 feet and 6 inches of clear stacking height."

"The palletized fruit storage (British Columbia) has a floor-to-ceiling height of 22 feet. Wooden pallets hold 48 boxes and are stacked 3 high. As compared with older 9-foot ceilings, these have much lower construction costs and are much easier to cool and to operate."

"Were we to build a new installation with no limit on door sizes (presently 8 feet high), probably the clear ceiling height would be 24 feet. This would permit future improvements to be readily used."

"For a proper pallet load we decided on about 2,000 lbs. per pallet. With this as a base and a 40x48 inch pallet, we checked load heights of various commodities and found that 4 feet of height would give 2,000 lbs, with most dense commodities. On lighter densities we did not attain 2,000 lbs but we felt that regardless we should stack to about 4 feet high on the pallet. With a 6 inch pallet and 4 foot load, 3 pallets high, we arrived at 13 feet and 6 inches. With our girder and roof purlin construction, with underside of roof 17 feet above the floor, we feel that where girders are not in the way we can go as high as 14½ to 15 feet with light-density commodities, depending on pile stability."

"In our case we arrived at an average height (of pallet) of 4½ feet, hence the 18 foot piling height."

"We use 36x48 inch pallets since they are best fitted for our present reefer car doors and because they seem best for handling various sized packages. Our average pallet load is 1500 lbs. Our fork trucks have a capacity of 3200 lbs. Our stacks run to 16 to 18 feet, depending on type and strength of packages."

"You should not stack over 4 pallets high . . . generally speaking, four pallets high will make a stack about 15 feet."

"We have found that it is not practical or economical to try to stack more than three pallets high or about 11½ to 12 feet, because so much product is packaged in fibreboard containers which crush in the bottom courses when piled higher."

"About 18-foot stacks in 20 foot rooms seem to be the best bet (for the future). With improved racking devices, long hold items might be stacked higher."

"Our stacks run 16 to 18 feet, depending on type and strength of packages."

"We believe that stacking above 16 to 18 feet is uneconomical and dangerous due to slow speed of elevation in low-temperature rooms and difficulty of properly placing the top pallet. The operator's angle of vision is very poor, even at 12 feet, and above that height the job becomes more difficult and danger of falling objects is great."

"We allowed only 6 inches from the coils because this is all that is necessary for stacking purposes and because of the small differential between our brine temperature and air temperature. With a larger differential we might have allowed more space from coils to top of piles."

"I firmly believe almost any commodity can be stacked 3 pallets high, and if I should build a warehouse I would want a ceiling height of 18 feet. I think that is most profitable considering everything."

General Principles

1—The height of the average pallet plus 6 inches of clearance from coils is the criterion we use in determining ceiling height of new buildings.

2—The higher you stack, the cheaper the cost of construction per cubic foot in single story buildings.

3—Suitability of freight to stacking may often determine ceiling height.

4—Type business—bulk vs distribution—may determine ceiling height.

Establish height of your average pallet load. You are going to do this anyway if you are to use supporting frames on pallets. Another factor is type of fork truck and whether you can obtain a truck with collapsed mast height that will go through your doors and still stack the required heights in the rooms.

Defense Transport Adminstrator Tours Baltimore Warehouses

Fully cognizant of the essential role which refrigerated warehouses play in the nation's defense effort, Defense Transport Administrator James K. Knudson and members of his staff chose November 28 as the date for an on-the-spot checkup of some typical refrigerated warehouses in Baltimore, Md. In the picture are: Col. Harold Boston, acting chief, Storage and Terminal Facilities Section, OPS; Harold K. Osgood, director of storage and warehousing, DTA; A. B. Efroymson, Cleveland, Ohio, vice president of NARW; J. F. Meagher, general manager, Merchants Terminal Corporation, Baltimore; Col. Robert Hendon, DTA; Defense Transport Administrator James K. Knudson.

FrozenFoods
*Reg. U. S. Pat. Off.
PREPARATION PACKAGING FREEZING STORAGE DISTRIBUTION DESIGN CONSTRUCTION EQUIPMENT

Fruit Processing Plant Expands Storage And Freezing Capacity

TO TAKE care of additional storage demand, the Millburg Growers Exchange, Millburg, Mich., has expanded its freezing and zero holding capacity. The completed plant is 200x227 feet, with 71,960 square feet of floor space. Besides the new addition it includes a 32 F apple storage space of 80x160 feet, a fresh fruit packing space of 80x200 feet and processing space of 40x80 feet. A part of these facilities have basements and two floors.

The construction of the new refrigerated warehouse is the conventional type of flat slab floors supported by heavy columns in such a design as to permit the insulation material to pass entirely around the room in envelope form. There are nine inches of insulation on top of the 6-inch reinforced concrete slab in the ceiling and roof deck which will permit another story to be added if future needs demand.

Main Floor Insulation

The main floor is an 8-inch reinforced concrete slab with 8 inches of insulation plus a 3-inch mesh reinforced concrete wearing floor. The side walls are of 8-inch glazed tile, put up in curtain style and support nothing but their own weight plus the 8 inches of insulation bonded to them. The insulation is a combination of Zerolite and Styrofoam. There are 32 F apple storage rooms in the basement below the zero storage space.

One unusual feature is that the surge drums are placed above the roof deck to permit the coils to be mounted closer to the ceiling. This saves considerable space that can be used for product piling.

The blast type tunnels are inside one of the 100x67 ft rooms and each consists of a heavy bank of coils with a 7-foot ceiling directly over them. A large fan is mounted above the ceiling which draws the air through the coils and forces it forward between the 7-foot ceiling and the regular insulated ceiling of the storage room, then down through a 2-foot slot in front and across the product to be frozen.

The quick freezing capacity in the tunnels is 65 tons of product every 24 hours. The product is handled entirely on electric trucks.

The second 100x67 ft room has two six ton air blast units in addition to the heavy ceiling coils. This arrangement makes it possible to freeze peak loads beyond the 65 ton capacity of the tunnels.

In the engine room one 9¼x9¼ compressor is cross connected to take its suction from either the intermediate pressure or the low side and can therefore do emergency duty as a booster. This arrangement saved the investment in a stand-by booster and is used during times of peak freezing loads. A small 6½x6½ compressor will do all the holding on the entire 3 million pounds after the product is entirely frozen.

Frozen Food Convention Chicago March 3-7

THE 1952 National Frozen Food Convention will be held in Chicago, March 3-7, 1952 at the Conrad Hilton (Stevens) Hotel. All factors in the frozen food industry will be represented at this all-industry convention: brokers, distributors, packers, refrigerated warehousemen and suppliers. A fine program is being arranged, but plenty of time will be left free for individual business contacts. Every company with a stake in the frozen food industry will have an opportunity here to keep fully informed concerning new developments in the industry, supplies, equipment and services involved in producing, distributing and retailing frozen foods.

As usual the annual meeting of the National Association of Frozen Food Packers and of the National Wholesale Frozen Food Distributors will be held and many brokers, supply men, warehousemen as well as packers and distributors of frozen foods are expected to participate in the convention.

Food Freezing in Canada

THE recent advancement in freezing food to preserve it enables many Canadian homemakers to store a great variety of different products this way. The home economists of the Consumer Section, Canadian Department of Agriculture, say that freezing is one of the most practical and highly appreciated developments today.

It is added, that of course, not everyone in Canada is able to have a home freezer, but there are a great number of locker plants throughout the ten provinces. When homemakers take advantage of such freezing facilities, they find it a simple matter to conserve large quantities of foods. For those who have neither a locker nor a freezer, a host of commercially frozen foods are available in the shops.

Test on storing frozen cooked foods show that all cooked meats or poultry freeze well.

The Department states that meats must be properly wrapped or packaged in moisture-vapor-proof material for freezing purposes. Cooked meats and smoked pork products generally should not be stored longer than three months, it is cautioned.

Frozen Cut Corn Pack Shows Increase

MORE frozen cut corn was packed in 1951 than in any preceding year. A preliminary tabulation by the National Association of Frozen Food Packers indicates that 44,511,584 pounds were packed in 1951, a total nearly 35 percent greater than last year's pack.

Production in Western states was almost twice as great this year as in 1950, and the pack in the Midwest also registered an increase over last year. In the East and South, however, 1951 production was down slightly from the 1950 total.

The pattern of container-size usage was somewhat different from last year. While the pack in retail sizes this year was greater than in 1950, the big gain in volume was indicated for large institutional and industrial sizes (30 lb. and 50 lb. containers). The pack in small institutional sizes increased slightly.

"Rapid Ice" Freezing

(Continued from page 16)

its small size and the saving of power, are indeed weighing in favor of the adoption of this method.

Those contemplating establishing new block ice factories, and small-ice by no means can as yet altogether replace the block-ice in Southern countries, will surely be interested, and have to consider the rapid-ice method of block-ice production.

It is also to be noted that the rapid-ice method has finally solved all difficulties which so far were connected with the production of ice from sea water.

It would be greatly appreciated if scientific bodies related to refrigeration would interest themselves in the study of the physics of ice crystal formation, for the benefit of further development of, and advancement in, modern ice production.

Trade Associations Grow Numbers Increase

A SATISFYING picture of the growth in size and effectiveness of the nation's trade association was painted at a recent meeting in Chicago held by executives of America's trade organizations. Whereas in 1930 they were only 4,000 trade groups scattered throughout the United States, today there are 12,000.

Attributing their healthy expansion to a proved capacity for providing concrete help to their many members, one association executive put it this way: "The average businessman feels he cannot get along without his association in trying to keep abreast of the regulations coming from OPS, NPA and other government agencies. Also, associations have become industry voices in Washington. Instead of a babble of voices, you have one voice talking." The long-term growth trend of associations is being accelerated by the defense program. The growth of government regulations has made the trade association's Washington representative one of its most valuable services.

Canadian Refrigerator Sales Increase

CANADIAN factories turned out fewer electric refrigerators during August than a year ago, but production in the first eight months of 1951 was still higher than last year. Output of electric refrigerators (household) during August declined to 17,323 units from 26,474 but in the cumulative period rose eight per cent to 229,502 units from 212,829.

Ice Industry Review

(Continued from page 22)

A North Carolina distributor expresses the opinion that the basic need of the ice industry is to have a better load factor for the plants in operation and for the ice delivery trucks operating on the street. He says they have entirely too many plants in operation in their territory and his thought is that the answer to the problem lies in eliminating less efficient plants, consolidating deliveries and otherwise getting their plants and business management in order to operate on a conservative and profitable basis.

The opinion of a central Ohio distributor is that the ice industry cannot expect to create any appreciable volume. It is volume that is needed to reduce costs. The clumsy way of making ice in 300 lb. blocks and then breaking it up for sized ice is still used. This, he maintains, is a waste of equipment and space, and he hopes that someone will find a way to make a machine for making crushed and cube ice.

From a Washington distributor comes the thought that to enlarge or open up new markets, every possible means to sell block or processed ice must be examined, such as meat and fish markets, vegetables, bakeries, hospitals, etc.

New Mexican Meat Plant Will Export to U. S.

OPERATIONS are getting under way in the new $150,000 meat chilling and curing addition to the cannery of Frigorifica y Empacadora at Agua Prieta, just across the Mexican line from Douglas, Ariz. Two hundred workers will be employed and three hundred cattle will be processed daily.

The addition, under construction since late July, includes 12,412 square feet of floor space. Largest unit is the chilling room of 7,656 feet, with capacity to store 1,000 carcasses for two days in the 30 deg. temperature required by regulations.

In the curing room the meat is cut into long strips and automatically salted by machines. It is then packed in barrels for shipment to the United States. American sanitarians say that the freezing and curing remove any danger of Mexican meat transmitting foot-and-mouth disease to this country.

Santa Fe to Build New Cars

THE Santa Fe Railway has announced that it will build 30 mechanical refrigerator cars in its shops. The cars will be powered with Diesel-powered refrigeration systems.

Refrigerated Warehouse Review

(Continued from page 48)

prospects for the year 1952 and their occupancy should increase.

A Boston warehouseman expresses the opinion that with the present policy of the government to encourage large food crops, the outlook for 1952 would appear favorable for high occupancy of warehouses, particularly freezers.

A St. Louis operator says that unless warehousemen can get relief from unwarranted high costs from Washington, anyone's guess is as good as his concerning the final outcome of 1952 operations. Any further increases in operating costs, he adds, will have to come from profits.

The evolution in refrigerated storage continues, says a Cleveland operator, and they are earnestly watching these developments. Generally speaking they are optimistic over the 1952 prospects.

From Philadelphia comes the prediction that business in 1952 will increase and in anticipation of this a program has been adopted for further expansion.

A Nashville, Tenn. warehouseman expects another good year in 1952. With production high and income high, the cold storage business should receive its share of goods, he says.

From Milwaukee comes a report that they look forward to continued changes in the industry. The storage of shell eggs will probably continue to decline as year round production becomes more of a reality, and they further anticipate a continued decline in butter storage as a result of the large increase in oleo consumption. With increases however in the frozen fruits and vegetable field, they believe their tonnage volume next year should be about the same as last year with, however considerably increased costs, and with a proportionate decrease in net earnings.

It appears to a Texas warehouseman that for the immediate future and for many years to come, refrigerated warehouses will be called upon more and more to preserve the foods for the public and for export.

Trapped in Refrigerator Car Driver Awarded Damages

A 60-YEAR old truck driver of St. Louis, Mo., who said he shivered through 100 minutes in a closed refrigerator car, received a cash award of $45,000 for his discomfort. Fred J. Lesch, who sought $100,000 damages from the Terminal Railroad Association, told a circuit court jury he was trapped in the railroad car while checking freight. He said a switchman slammed the door shut and the car was moved to a new location in the freight yards. Another truck driver finally missed Lesch, who was found unconscious in the car.

Chicago Section, A.S.R.E.

AT THE regular monthly meeting of the Chicago Section, American Society of Refrigerating Engineers held Thursday evening, October 11, John Jennings, Mitchell Manufacturing Co. presented an interesting paper on the production of room air conditioners.

The production of room air conditioners he said is going through the same evolutionary stages in its development as did the automobile. The mechanical evolution of room air conditioners has now reached a high stage of development and present emphasis is being placed on getting reliability of all factors and styling.

Hermetically Sealed

A hermetically sealed system is a must. Compressors are far ahead in improved efficiency and ready use. Vibration and noise are reduced. There is a wide range in hp selection. Their cost has gone down due to mass production and new manufacturing technics. Units are now built more compactly and a one ton unit can now be packaged in a dimensional unit formerly required for a half ton unit.

There are still many unsolved engineering problems for the development of the mass market. For example a higher performance level is desired, particularly on low voltage conditions as found in rural areas. Improved serviceability or easy replacement of major components in a matter of minutes is needed. Adaptability to various types of windows is necessary. A longer life expectancy with a dry system is required. A pleasing appearance that will blend harmoniously with surrounding furnishings and weight reduction such as by using aluminum in coils, base plates, cabinets and compressors will be additional improvements.

Tested on Pilot Plant

All new models or designs are thoroughly tested on a pilot plant scale for their performance ability before marketing. Twelve to twenty units of a design are made in a pilot plant run for these tests and at the same time this pilot plant run is studied for production bottlenecks where the kinks are revealed and then smoothed out. These units are then given the ASRE rating test; the ACRMA maximum performance test at 90 percent and 110 percent of rated voltage and a third test is made at 115 F for insulation and condensate disposal.

These tests have been of great value since defects may show up which would otherwise be caught in the field at a much greater expense.

Color pictures were used to show the assembly, and equipment testing methods.

Much interest was aroused in the question period as to the necessity of testing at 115 F. Mr. Jennings reported experiences in the South of as many as six consecutive days of such temperatures where these units performed successfully without condensate appearing or causing wet spots and he believes his company has benefited considerably from these tests and this happens to be a good example of the importance of these tests.

Technical Service Meeting

Also considerable interest was shown in the young engineers technical service meeting headed by Mike Goddard from 5 to 6 p.m. where many members and young engineers held a lively and spirited discussion on low temperature refrigeration problems.

Indianapolis Chapter ASRE

THE Indianapolis Chapter American Society of Refrigerating Engineers, at the November meeting, heard an address by Eddy Miller of the Kramer-Trenton Company on hot gas defrosting, illustrated with a working model and slides. The growing importance of low temperature refrigeration made this a timely subject.

Refrigerator Sales Down

SEPTEMBER factory sales of electric household refrigerators totaled 215,459 units compared with 535,002 in the previous month, the National Electrical Manufacturers Association reported. For the first nine months of the year sales were 3,209,338, compared with 4,622,679 in the like 1950 period. September electric range sales were 96,182 compared with 156,216 in the 1950 month. For the first nine months, sales were 982,827 as against 1,218,186 in the corresponding period last year.

Annual Contest for Deer Hunters Swamps Facilities of Central Texas Ice and Locker Plant

STAGING each year a "prize contest" for the best Texas whitetail deer killed by local hunters, has not only built immediate locker rental volume, but likewise created much goodwill for Geyser Ice Company, in Waco, Texas. For the past several years, at the beginning of the deer season, which opens November 16 and ends January 1, the company has offered a prize of $50 for the prize deer, $25 for the smallest whitetail deer killed, and $15 in locker rental credit for the runner-up to the first prize.

"Actually, the contest is placing a strain on our facilities," R. S. Brassel, general manager, and Gordon Harriman, owner, indicated. "We really need four times the amount of freezer storage space which we have currently available for the hunters, and frequently, we find it necessary to refer lucky hunters to other ice plants or locker plants for venison storage. We expect upwards of 200 deer to be entered in the prize contest for the 1951-1952 season, and although we will not be able to take care of more than a small percentage of that volume within our own plant, we will see to it that adequate storage is available through co-operating plants."

Geyser Ice Company has steadily promoted big-game hunting in the central Texas area, for the past 10 years, with complete facilities for dressing and packaging of game meats. Deer processing has been charged at a flat 7.50 per animal, since the end of World War II, irrespective of size, and prize-winners are always photographed and the picture displayed in the handsome Geyser Ice Company showroom on Webster avenue near the downtown Waco district.

"Originally, the contest program was begun merely to impress upon the public that we had large amounts of locker space and freezer space available for game storage," Mr. Brassel added. "But, as the volume of hunters has increased, so has other commercial need for locker space, with the result that we have been carrying on the contest in recent years more on a goodwill basis than any other. We feel that many of the co-operating locker plants in the city receive additional revenue, due directly to more effort expended by hunters, and that anything which helps the refrigeration business as a whole, of course, helps us."

The Central Texas ice firm is beginning an extensive expansion program, which will be fully under way during 1952, and which will require around five years to complete, according to Mr. Harriman.

CONVENTION CALENDAR

MISSOURI VALLEY ICE MANUFACTURERS ASSOCIATION
January 7-9, 1952
Hotel President, Kansas City, Mo.
V. A. ESPHORST, Secy.-Treas.

KANSAS ASSOCIATION OF ICE INDUSTRIES
January 7-9, 1952
Hotel President, Kansas City, Mo.
FRED E. KUNKLE, Secretary

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
January 20-22, 1952
Burlingame Hotel, Bartlesville, Okla.
HARRY T. HUDSON, Exec. Secy.

MICHIGAN ICE INDUSTRIES ASSOCIATION
February 12-13, 1952
Detroit Leland Hotel, Detroit, Mich.
EDWARD W. JACKSON, Secy.

GEORGIA ICE MANUFACTURERS ASSOCIATION
February 19-20, 1952
Ansley Hotel, Atlanta, Ga.
RICHARD W. FLORRID, Secretary

SOUTHERN ICE EXCHANGE
February 19-20, 1952
Ansley Hotel, Atlanta, Ga.
RICHARD W. FLORRID, Secretary

OHIO ASSOCIATION OF ICE INDUSTRIES
February 25-26, 1952
Deshler Wallick, Columbus, Ohio
ELIZABETH SHANNON, Secretary

NATIONAL ASSOCIATION FROZEN FOOD PACKERS
March 3-7, 1952
Conrad Hilton Hotel, Chicago, Ill.
L. S. MARTIN, Secretary

NORTH CAROLINA ICE ASSOCIATION
March 10-11, 1952
Hotel Sir Walter, Raleigh, N. C.
LEWIS H. POWELL, Secy.-Treas.

SOUTHWESTERN ICE MANUFACTURERS' ASSN.
March 12-14, 1952
Hotel Texas, Fort Worth, Texas
P. A. WEATHERRED, Secy-Counsel

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
March 20-21, 1952
Leland Hotel, Springfield, Ill.
WM. D. WRIGHT, Secretary

VIRGINIA ICE MANUFACTURERS ASSOCIATION
March 20-21, 1952
George Mason Hotel, Alexandria, Va.
H. H. SNYDER, Secretary

EASTERN STATES ICE ASSOCIATION
March 20-21, 1952
George Mason Hotel, Alexandria, Va.
SAMUEL FREER, Secretary

NEW ENGLAND ICE ASSOCIATION
March 27, 1952
Kenmore Hotel, Boston, Mass.
RAYMOND T. WILBER, Secretary

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
March 26-28, 1952
Yakima Hotel, Yakima, Wash.
L. F. MARSH, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES
March 31-April 3, 1952
French Lick Springs Hotel
ROBT. W. WALTON, Secretary

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
May 5-8, 1952
Roosevelt Hotel, New Orleans, La.
WM. DALTON, Executive Vice-Pres.

ASSOCIATION DIRECTORY

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

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NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres. Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
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CANADIAN ASSOCIATION OF ICE INDUSTRIES
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317 Eglinton Ave., Toronto, Canada

DELTA STATES ICE ASSOCIATION
R. N. Milling, Secretary
Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
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1044 Drexel Ave., Drexel Hill, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary
1926 Silver St., Jacksonville, Fla.

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Cincinnati, Ohio

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Robert W. Walton, Secretary
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KENTUCKY ICE MANUFACTURERS ASSOCIATION
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MICHIGAN ICE INDUSTRIES ASSOCIATION
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Espy Ice Co., 2101-31st St., Denver 5, Colo.

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W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary
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Terminal Refrigerating & Warehousing Corp.
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Seattle, Wash.

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Elizabeth Shannon, Acting Secy.-Treas.
The Steubenville Ice Co., Steubenville, O.

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
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708-9 Perrine Building, Oklahoma City, Okla.

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SOUTH CAROLINA ICE MANUFACTURERS ASS'N
Geo. L. English, Secretary
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Diamond Ice & Coal Co., Charleston, W. Va.

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Paul F. Hoff, Secretary
1300 East Locust St., Milwaukee, Wis.

New Plants and Improvements

California

Delano, Calif. — Pandol and Sons Co., plan to construct a $150,000 cold storage plant.

Florida

Tallahassee, Fla. — Middle Florida Ice Company has two new S & S ice vending stations in operation.

Indiana

Bicknell, Ind.—Two new ice-vending machines have been installed by the Bicknell Ice & Coal Co. at its ice plant. The vending service makes ice available 24 hours a day.

Kansas

Newton, Kans.—Newton Ice Company is now operating two new S & S ice vending units.

Wichita, Kans. — Steffen's Dairy Foods Company, last month established an S & S automatic ice vending station.

Michigan

Douglas, Mich.—Lloyd J. Harriss of the Lloyd Harriss Pie Co. of Chicago recently purchased the Morgan Ice Company here and is planning on building a processing plant to freeze fruits for use in the Chicago pie bakery.

Mississippi

Meadville, Miss.—Meadville Ice & Storage Company is installing two new S & S ice vending machines.

Pascagoula, Miss.—An $18,000 addition to storage space at the Pascagoula Ice and Freezer Co. was recently approved by the board of zoning and adjustment. The addition, said Quin Gautier, representing the company, will double the firm's storage space, giving room for up to a half million pounds of seafood.

Missouri

St. Louis, Mo. — Independent Fish Company, organized 21 years ago at 2746 Market Street has greatly increased its facilities with the addition of a new cold storage area in an adjoining building. The room provides 300,000 cubic feet of storage space. It holds over 15,000,000 pounds of frozen seafood at a constant temperature of 10 degrees below zero. The entire room is sheathed in an 8-inch cork insulation material.

Nebraska

Omaha, Nebr.—A building permit for the United States Cold Storage Corporation's new freezer plant at 4302 South Thirtieth St. was issued recently in the amount of $500,000. The amount covers only the construction. The completed plant is expected to cost approximately two million dollars.

Ohio

Bridgeport, Ohio—The Louis Niebergall Ice Company recently established another S & S ice vending department.

Rhode Island

East Greenwich, R.I.—As a result of constantly increasing business, the East Greenwich Dairy Company is making plans for further plant expansion. An ice cream plant will be built, separate from the balance of the dairy business. Plans call for the erection of a brick building 80x36 feet. The frame section of the main plant will be replaced by brick.

Sales and Reorganizations

Belleville, Ill.—The Krey Packing Company has purchased a second plant here and started production January 1. The plant at 9300 Carbon St., was purchased for an undisclosed price from the Reynolds Spring Co. It is planned to make a new product in this plant. It will be Kri-Pi, a beef pie that can be quickly made ready to serve. The ingredients will be in one section of the container and the crust mix in the other. A section of the plant, which contains 100,000 square feet of floor space, is being leased to Dinner Bell Foods of St. Louis for preparation of the pie crust.

Osawatomie, Kans.—The Southwest Ice and Dairy Products Co. of Oklahoma has sold the plant here to J. S. Todd of Paola and Cleo E. Brown of Harrisonville, Mo. Messrs. Todd and Brown operate an ice and locker plant at Paola. Dean Meiers remains as manager of the plant here.

Stafford, Kans. — Ben Evans has purchased the Western Light & Telephone Co. building which for years has been used as a distributing point for ice users. The utilities firm, once one of the largest ice manufacturers in Western Kansas, has been closing these establishments. Roy Smiley has been handling sale delivery and will have ice available. Evans says he has no definite plans for use of the property and it will be some time before he takes possession.

Okolona, Miss.—The Okolona Ice & Fuel Company, owned and operated since 1946 by J. L. Blackwell, has been sold to the Magnolia Corporation which operates ice plants at Columbus and Aberdeen. The new owners, T. A. McGahey, Jr., Adlie M. Jones and McGahey Harrison, plan to rebuild the plant which was destroyed by fire on July 30.

Rolla, Mo.—The Patton Creamery Company, here, has purchased the Rolla Creamery & Ice Company's ice cream and butter business from Taylor Lenox and Sons, David and William. Mr. Lenox stated he has sold the building at 6th & Rolla streets and the ice business and equipment to the Mueller Distributing Company.

Edna, Tex. — J. W. Porter, local manager of the Central Power and Light Co., has announced the sale of the firm's Edna ice plant and locker plant and the Ganado locker plant and retail sales ice station to Lonnie Knuppel and Francis Barron.

Altoona, Pa. — Ameene E. Namey has purchased the Blair Ice and Cold Storage Co., located at 3124 Fifth Ave. Blair ice is one of the county's largest producers of ice and supplies its products to many industrial corporations, including the Pennsylvania Railroad.

Icy Item

Enid, Okla.—Enid Ice and Fuel Company, Inc., filed articles with the office of the secretary of State at Oklahoma City, increasing its capital stock from $80,000 to $100,000.

New Incorporations

Nogales, Ariz. — Formation of the Mex-Maid Food Products Company was announced recently when articles of incorporation were filed with the Arizona Corporation Commission. Incorporators are Carlos Ronstadt, Amado; Fred L. Blanc, Tucson and Louis Escalada, Nogales. Corporation capitalization was set at $1,000,000. The firm will carry on a general retail, wholesale, meat market and food processing business.

Thomson, Ga.—The Kelso Packing Co., a new meat packing firm, is being incorporated by L. C. Barlett, A. O. Kelso and E. R. Prow, Jr. The company has purchased the community abattoir from W. L. Davis and is making an addition to the building. A new 40x80 ft brick building is to be constructed near the abattoir.

Minden, La.—North Louisiana Ice Company, Inc., ice and frozen products, filed articles of incorporation with the office of the secretary of state recently, listing capital stock at 1,000 shares no par value.

Beloit, Wis.—Lindahl Ice & Fuel Company, Inc., 136 Park Ave., Beloit, Wis., filed articles of incorporation with 2000 shares without par value, to deal in ice, fuel, gasoline, tires, batteries, etc. Harold W. Lindahl and Mary I. Lindahl, both of Beloit are the incorporators.

Fires and Accidents

Chicago, Ill.—One man was killed and another injured December 10 when a half pint of liquid ammonia spilled over them while they were installing freezing equipment at the Continental Freezer Corp., 4220 S. Kildare Ave.

Portland, Ore.—Fire demolished most of the Portland Provision Company plant north of here and destroyed many thousands of dollars worth of meat products. Loss was estimated by a company official at a minimum of $100,000.

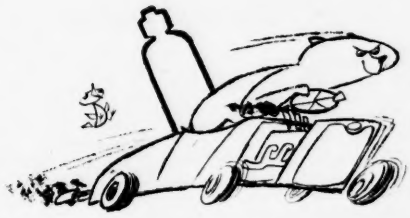
Churches Go Modern With Air Conditioning

THE pastor of a Catholic Church at New Brunswick, N. J., asked himself one day: "If the movies can have air conditioning, why can't we?"

The Rev. John C. Body could find no objections and as a result, 46-year-old St. Ladislaus Church became the first in the East to install year-round air conditioning for the benefit of the parishioners.

At that point, Don P. Mondi, whose company installed the "all year" equipment, was inspired to do some missionary work of his own. Mr. Mondi has set his goal on having New Brunswick known as the "City of Air-Conditioned Churches."

Already the St. Ladislaus installation has been followed by a similar program in the Episcopal Church of St. John the Evangelist. More of the city's churches are considering the year-round equipment.



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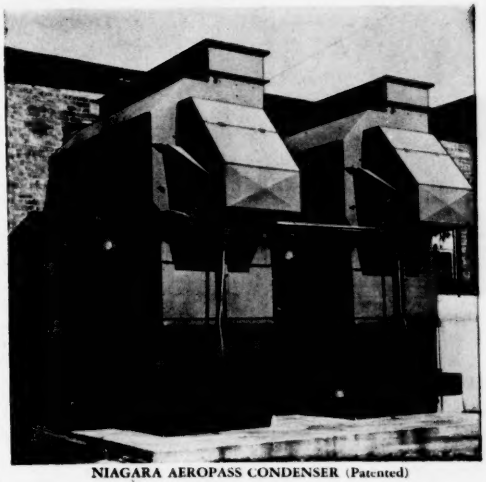

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Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

The "Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

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DEATHS

Arnold J. Hecker

THE death of Arnold J. Hecker, well known refrigeration engineer, occurred suddenly at Deaconess Hospital, St. Louis, December 9, at the age of 61 years. He had entered the hospital a few days before his death for checkup.

Mr. Hecker for a number of years was a vice-president of the St. Louis Refrigerating and Cold Storage Company. A specialist for this company in the refrigeration engineering field, many years ago he installed an underground direct expansion pipeline refrigerating system for produce houses in St. Louis which has 30 miles of underground piping.

He graduated from the University of Missouri in 1912 and taught there briefly. He joined the St. Louis company 32 years ago. In 1950, he was appointed a Marshall Plan administrator for refrigeration development in Korea, a project interrupted by the war there.

Among his civic and charitable contributions were 15 years service as a member of the Board of Directors of the St. Louis Altenheim. He also served 18 years as chairman of the Richmond Heights Plan and Zone Commission.

He was a thirty-second degree Mason, a member of the Missouri Athletic Club and a member of the National Association of Practical Refrigerating Engineers and the American Society of Refrigerating Engineers.

Surviving is his widow, Mrs. Dorothea Schroeter Hecker.

Albert R. Shepherd

AFTER an illness of some six weeks, Albert Shepherd, died on November 26. For a number of years he had been superintendent of the Fulton Market Cold Storage Co., Chicago. Well known in his industry, Mr. Shepherd had done important work on N.A.R.W. committees.

During the war, recommended food storage temperatures for government storage were prepared under the Committee on Plant Operations. More recently he was chairman of the Safety Committee and directed an industry-wide survey of accident experience which produced the most thorough data ever assembled on the subject.

Surviving are his wife, a daughter, Mrs. E. M. Myers, Glen Ellyn, Ill., two grandchildren; and a brother, W. B., of Sullivan, Ind. Interment was in Glen Ellyn where Mr. Shepherd had been a resident for 37 years.

Herbert I. Schory

THE death of Herbert J. Schory of the Canton Ice and Cold Storage Company, Canton, Ohio, occurred Sunday night, December 2 in the Mercy Hospital in Canton after he had suffered a heart attack the day before.

Mr. Schory was born in Minerva, Ohio, but had lived in Canton for the past fifty-eight years. "Rube", as he was known to his legion of friends, was an active member of the National and Ohio Associations of Ice Industries and had served as a member of the board of directors of the state association. He was one of the founders of the Schory and Schellhase Coal & Ice Co. thirty-four years ago and helped to organize the Canton Ice & Cold Storage Co. in 1930. He was graduated from Ohio State University in 1910 and was assistant coach and captain of the 1910 football team. He was a member of the Trinity Reformed Church and various Masonic Bodies. He is survived by his widow, Mrs. Geneve Schory, and a son, Dr. John Schory.

LEO PAUL DUCEPPE, 3700 Hochelaga street, co-owner of Duceppe & Frere Ice Company, Montreal, Canada, was killed Saturday afternoon, November 17 when the rear wall of a building being demolished caved in. His 40-year-old brother, Roland was seriously injured. The wall collapse sent the men tumbling 40 feet to the bottom of the 50-year-old building. Leo Paul Duceppe was found dead under the pile of debris, while his brother suffered fractures of the pelvis, left shoulder and left arm.

CHARLES EDWARDS, 85, veteran of the ice manufacturing industry, died December 9 in Scranton, Pa. He formerly was superintendent of the Brady Brothers' ice plants in Hopatcong, N. J., which later became the Mountain Ice Co. He later moved to Gouldsboro, Pa., and served as general superintendent of the Mountain Co. plant there.

MRS. OLGA OETTING, Chicago, widow of William F. Oetting, one of the pioneer ice manufacturers of the midwest, died October 19 in the Hinsdale hospital. She was 72. Surviving are a son, William K. of Hinsdale and a daughter, Mrs. Louis Biel, Antioch.

JAMES P. SMITH, Red Bank, N. J., died November 12 in a Bridgeton nursing home. He was 85 years old. Mr. Smith was in the ice and coal business nearly 50 years in South Philadelphia.

ANDREW SPANO who operated an ice and coal business in Newark, N. J., until he retired in 1946 died November 15. He was born in Italy 65 years ago and came to this country in 1897.

Charles C. Sides

THE death of Charles C. Sides, manager of the Central Power & Light Co. ice plant at McAllen, Texas occurred Wednesday, December 12, in Brooke General Hospital, San Antonio. He was 67 years old.

Mr. Sides, a native of Canton. Tex., came to McAllen from Hillsboro. Before that he lived at Sherman for several years. He was a veteran of World War I. Survivors include his widow, two sons. Olan D. and Kenneth H. Sides, both of McAllen; three daughters, Mrs. C. E. Tedwell, Goliad, Mrs. Ina Mae Stewart. San Antonio and Miss Betty Jean Sides, McAllen.

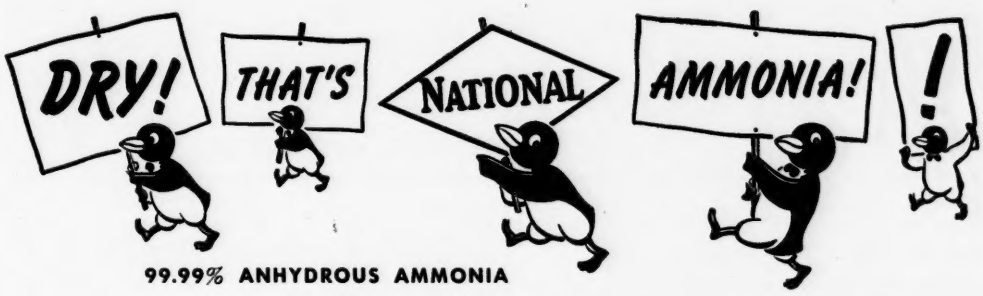
LYNN BOYD, retired ice manufacturer of Paducah, Ky., died of a bullet wound in the right temple November 25. He was 58 years old. Boyd sold his interest in the Home Ice Manufacturing Company two years ago. A native of Paducah, he was a member of a pioneer McCracken County family. He is survived by his son, Lynn Boyd Jr.

HARRY A. MORGAN, formerly operator of an ice plant and coal business in Leavenworth, Kans., died recently at his home in Los Angeles where he moved in 1943. He was 66 years old and a native of Leavenworth.

CHARLES W. MCINTYRE, refrigeration engineer of Tiffin, Ohio, died November 19 in Mercy Hospital, aged 74 years. He was born in Wood County. Three sons and seven daughters survive.

British Exports of Refrigerating Machinery

DURING August refrigerating machinery to the value of £1,262,-881, ($3,536,006.80) weighing 2,571 tons was exported from the British Isles. Comparable figures for August, 1950, were 1,932 tons valued at £818,-460 ($2,291,688.00). Monthly average during 1938 was 236 tons, valued at £33,031 ($92,486.80). Of the August shipments, 66 tons went to British West Africa, 438 tons to the Union of South Africa, 91 tons to Southern Rhodesia, 92 tons to British East Africa, three tons to Bahrein, Kuwait, Qatar and Trucial Oman, 76 tons to India, 334 tons to Australia, 75 tons to New Zealand, 63 tons to Canada, 53 tons to British West Indies, 221 tons to "other Commonwealth countries," 89 tons to Irish Republic, 156 tons to Sweden, 33 tons to the Netherlands, 75 tons to Egypt, 10 tons to Iran, 75 tons to Brazil, 4 tons to Argentina, 617 tons to "other foreign countries."



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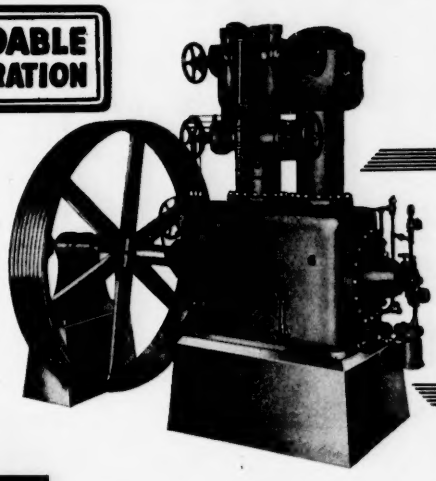

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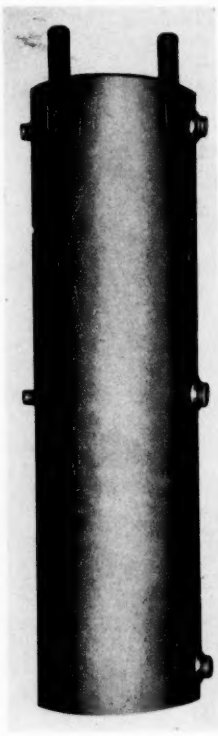
New Standard Unit For Heating and Cooling

A NEW line of units called HX-Changers for heating and cooling any combination of liquids and vapors has been announced by Rempe Co., Chicago, Ill.

These units are a shell and coil assembly having a basic rating of from 98 to 1760 btu per hour. They are practical for many applications such as water cooled refrigerant condensers; converting air-cooled compressors to water cooled service; combination water-cooled condenser-receiver; refrigerant to refrigerant heat exchangers on low temperature cascade and two-stage systems; water chiller using refrigerant as cooling medium; cooling lubricating oils using refrigerant; heating oils, chemicals, water and other liquids with steam. They incorporate a new sub-cooling feature which promotes the greatest possible heat transfer efficiency.

Made with 6⅝ and 8⅝ inch shell. Body is ASME welded construction. Coil tubes are copper on all sizes, except when made for oil treating, in which case steel coil is furnished. All steel construction is recommended for ammonia refrigerant service. Connections on shell are extra heavy steel couplings. Coil connections are IPS male thread. All units tested 350 lbs. pressure. Additional details may be obtained by writing The Rempe Company.



New Rempe HX-Changer

New Anti-Friction Bearing Lubricant

A NEW premium anti-friction bearing lubricant — Texaco High Temp Grease, which considerably extends the efficient range of operation of ball, roller, and plain bearings at high temperatures has been announced by the Texas Company. The new grease, it is claimed, exceeds established military and industrial standards in affording unusual protection at temperatures up to 300 degrees F for continuous operation and 350 degrees F for intermittent operation.

Texaco High Temp Grease is the latest formulation in a premium line which has been marketed for many years by Texaco. The present formulation is the product of a research program which continuously re-evaluates the company's greases in terms of field performance, new design needs, and research findings which result in improved components and service.

During its laboratory development, a variety of standard and special tests for anti-friction bearing operations revealed that the new grease has excellent oxidation resistance, and similar desirable characteristics for high temperature operation.

It far outran the hours-to-failure criteria of normal tests at 300 degrees F and continued to exceed test specifications at even higher temperatures. An unusual characteristic of the new grease is the efficiency of its performanec at high speeds as revealed in special ultra-high-speed endurance tests developed at Texaco's Beacon Laboratories, according to the manufacturers.

Its water resistance makes Texaco High Temp Grease applicable in operations where long retention of grease and resistance to washing out are factors.

Hand Motor Truck Helps Meet Manpower Shortage

AFTER MANY months of "on the job" testing and perfection under actual working routines, Moto-Truc of Cleveland, Ohio has added another adaptation of their "Walkie" truck line. Designed for use in meat cooler storage rooms of packing plants, this truck now does the work of several men. This pusher type truck keeps the sides flowing through at an even tempo on any production schedule.

This new truck handles 15 sides of beef on straight run trollies and 6 around curves. The pusher bar is manually adjustable for contact at the proper height. The sides are not damaged and a multitude of human hands touching the meat is eliminated by this new innovation.

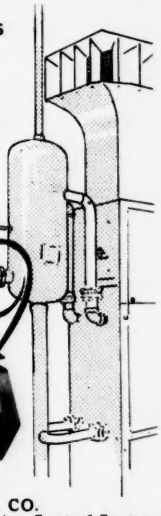
The truck incorporates all of Moto-Truc's famous features including simplicity of operation, two speeds forward and backward, "Deadman" brake control, etc. This truck is receiving wide acceptance in these days of manpower shortage.

New hand motor truck made by Moto-Truc, Cleveland, Ohio

How to assure
MAXIMUM B.T.U. TRANSFER
in "Packaged" Cooling Units

AIR COOLERS • WATER COOLERS
SHARP FREEZERS • ICE BUILDERS

Use
PHILLIPS
FLOAT CONTROLS



Instant response to wide variation in load is one major reason why the use of Phillips Float Controls contributes to high heat transfer efficiency in practically all cooling units. In addition, you gain maximum flexibility with a fewer number of valves to carry in stock because Phillips No. 300 and No. 301 Valves provide capacities of 2 to 50 tons for handling a majority of applications with the same mounting.

For complete satisfaction in Float Controls and Regulating Valves, combined with efficient engineering service help—willingly given—call on Phillips.

No. 300 and 301 Valves have Cartridge Construction: Direct Feed—7 orifice sizes; Remote Feed—8 orifice sizes.

Other Control Valves for high or low sides. Freon: 1 to 1000 tons, Ammonia: 1 to 2000 tons

H. A. PHILLIPS & CO.
Designers and Engineers • Refrigeration Control Systems
3255 W. CARROLL AVE. • CHICAGO 24, ILLINOIS

Your Assurance of Best Quality
REFRIGERATION COILS
made by The National
PIPE BENDING COMPANY

All features that you demand are furnished regularly in National Pipe Bending Refrigeration coils—smooth bends, perfect welds, measurements exact.

For long service, specify coils by the National

Pipe Bending Co.
Established 1883
162 River St., New Haven, Conn.

Welded Cans
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

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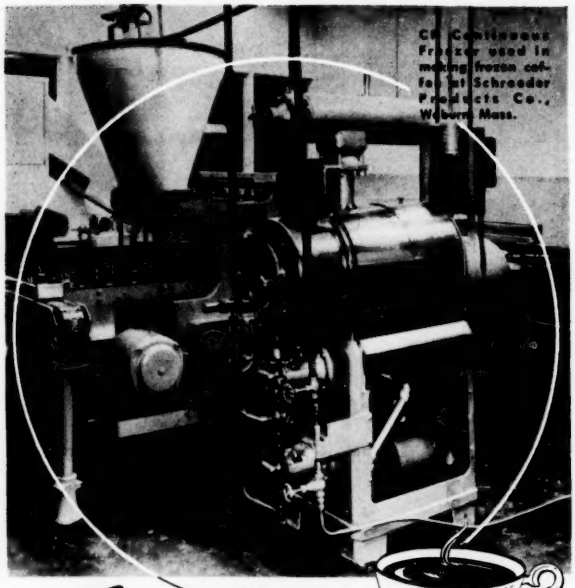
Industrial Trucks and Trailers

THE OHIO GALVANIZING & MFG. CO.
NILES Established 1902 OHIO



Freezing Fresher Flavor

into a cup of coffee

CP Continuous Freezer

In making frozen coffee concentrate, the first minutes after brewing are crucial. That's where CP Continuous Freezers (world famous for ice cream) are a real help.

In CP Freezers the concentrate is partially frozen to "lock" the flavor in before packing and final quick-freezing. In the famous CP "King Size" Cylinder, the large refrigerated area plus special CP blade design and slow-speed dasher action all combine to give the fast freezing needed to retain right-from-the-coffee-bean freshness and flavor.

Once set, a CP Freezer requires almost no supervision. Its dependability and low cost operation in continuous service have made it a top choice among freezers the country over.

Whatever your product, if it involves continuous slush freezing, investigate the profit possibilities of CP Freezers. Call in your CP Representative or write for full information.

CP Refrigeration for *QUICK FREEZING*

CP Compressors and Boosters include models specially engineered for quick-freezing. Any size—any capacity, you're ahead with CP's more than 60 years of refrigeration leadership and CP Job-Engineering for your particular needs.

THE *Creamery Package* MFG. COMPANY

General and Export Offices: 1243 W. Washington Blvd., Chicago 7, Illinois

Branch Offices in 21 Principal Cities

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD., 267 King St., West, Toronto 2, Ontario

THE CREAMERY PACKAGE MFG. COMPANY, LTD., *Mill Green Road, Mitcham Junction, Surrey, England*

MANUFACTURERS' NEWS

Carrier Corp. President Predicts Continued Demand for AC Equipment

A YEAR end statement has been issued by Cloud Wampler, president of Carrier Corp. Every indication, he says, points to a continuation in 1952 of the rising demand for air conditioning equipment that has been so marked during the last two years. If scarcities in vital materials can be overcome, it should be possible for the air conditioning industry to celebrate its golden anniversary year with a record volume of business.

How much of the civilian portion of this high demand can be satisfied will depend primarily upon government allocations of various metals. The present outlook is that a sizable amount of regular equipment will be produced. However, a share of this portion will go directly to the armed forces or under priorities to defense-connected industries.

Large manufacturers in the air conditioning and refrigeration field also have taken on a number of government contracts not related to their normal peacetime business. Carrier Corporation has accepted six defense orders of this nature. Two were completed in 1951. Two others have recently gone into production, and tooling is in progress on a like number.

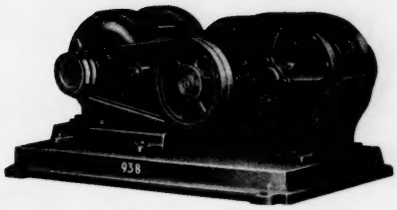
During the fiscal year that ended October 31, 1951, Carrier established new high records in earnings, completed sales and orders booked. Net profit after taxes of $6,956,000 was $3,574,348 on a total volume of $80,935,762 and new orders were booked in the amount of $83,095,567. The backlog of unfilled orders also increased, totalling $30,600,064 at the fiscal year-end which was exclusive of some $50,000,000 in defense contracts.

Carriers' performance during the year ahead will be governed in large part by the availability of necessary materials. However, it is anticipated that a sizable over-all volume of defense and regular business can be achieved.

New Jamison Representative

THE appointment of Louis C. Bewig, 3456 South Grand Blvd., St. Louis 18, Mo., to handle their line of cold storage, refrigerator, and insulated doors in the territory of eastern Missouri and Southern Illinois, has been announced by Jamison Cold Storage Door Company, Hagerstown, Md.

Compare these 3 essentials when you buy blowers... V•P•L VOLUME PRESSURE LOW POWER COST



No blower that fails to deliver these essentials is worth its cost, regardless of the price you pay for it. You can depend upon R-C Rotary Positive Blowers the year around, just as thousands of ice plant operators have been doing for many years. Write us about your needs or send for Bulletin R-C 1247, without obligation.

Roots-Connersville Blower Corporation
521 Columbia Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

SERVING THE ICE INDUSTRY FOR 20 YEARS

Dependable . . Automatic . . Refrigerated

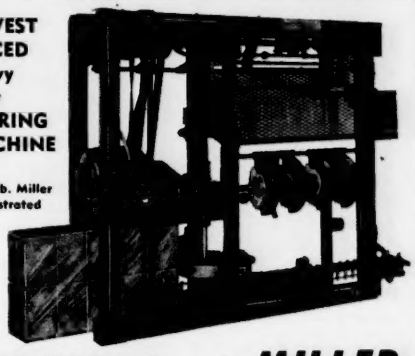
S&S ICE VENDING STATIONS AND ICE VENDING EQUIPMENT

Write, Phone or Wire for Full Details and Prices!

S&S Vending Machine Co.
670 LINCOLN AVE., SAN JOSE, CALIFORNIA
1101 N. HIGHLAND, ARLINGTON, VIRGINIA

LOWEST PRICED Heavy Duty SCORING MACHINE

300 lb. Miller illustrated



PERFECTION-made MILLER

300 LB. MODEL SCORES OVER 50 TONS PER HOUR

400 lb. MODEL SCORES 65 TONS PER HOUR

• Keep your investment at a minimum with a Miller Scoring Machine . . . the lowest priced heavy-duty scoring machine on the market. The Miller is fast, economical, dependable in operation and maintenance . . . a fact proved by the hundreds of machines in service all over the country.

Write, wire or call for complete details:

RE-BUILDING SERVICE

• Your present Perfection or Miller machines rebuilt to perform like new at minimum cost. *This service carries a "New Machine" guarantee.*

• Also a complete stock of spare parts for Perfection and Miller Scorers available for immediate shipment.

The Perfection Ice Scoring Machine Co.
P.O. Box 2140, Fort Worth Texas, Phone ED 1258

QUALITY COILS FOR ALL APPLICATIONS

WELDED HEADERS, PIPE BENDS AND AMMONIA RECEIVERS

Whether your next job be for a single bend, or coil or complete Piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.

Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

SEND DRAWING OR BLUE PRINT FOR QUOTATION

CHICAGO NIPPLE MFG. CO.
1997 Clybourn Ave., Chicago 14, Ill

Taylor Instrument Makes Changes in Sales Staff

MAJOR changes in the supervision of the sales department of Taylor Instrument Companies have been announced by Raymond E. Olson, newly elected president. Mr. Olson was formerly vice president and general sales manager.

Appointed to replace him as general sales manager is Frank S. Ward, who since 1945 has been industrial sales manager. Mr. Ward started in the order department of the company in 1917. In 1922, he moved to Boston as a salesman for the industrial line of instruments and in 1931 was made manager of the Boston office. Returning to Rochester, he supervised sales of the companies' products in the canning, textile and rubber industries from 1936 to 1945.

His place as industrial sales manager is being taken by Albert J. Fleig, who, since 1945, has been divisional sales manager in charge of sales to the chemical, petroleum and canning industries.

Frank S. Ward *Albert J. Fleig*

Easier and Cheaper with

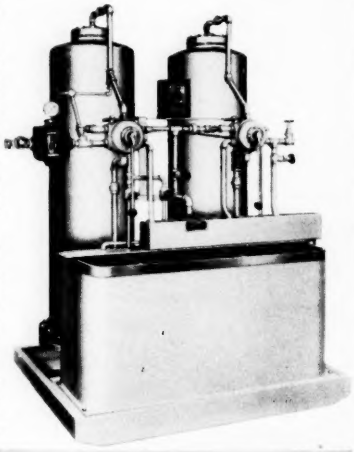
INDUSTRIAL Water Demineralizer

It's worth looking into . . .

The demineralization of water is not something new. It is used in the food industry, in the chemical and other industrial processing where chemically pure water is used in quantity. The very low cost warrants your looking into it.

Here are some of the advantages you get with an INDUSTRIAL demineralizer in ice making. Since the dissolved mineral salts in ordinary water are removed in passing through the ion-exchange resins, core-water removal and replacement is unnecessary. Losses due to cracking are greatly reduced. Freezing at the lower brine temperature increases daily yield. And the bulk of the cake of ice is clearer—your customers will notice that.

If you will send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour) we will send you information on INDUSTRIAL demineralizers, estimate of costs, performance data, etc. Better do it now.



A typical two-bed INDUSTRIAL Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

FILTERS Pressure Type · PUMPS Centrifugal · CORROSION TESTING APPARATUS Salt Fog • Humidity

INDUSTRIAL FILTER & PUMP MFG. CO.

5914 Ogden Avenue
Chicago 50, Illinois

RUBBER DIVISION
Vulcanized Linings • Molded Products

WATER DEMINERALIZERS

Gifford Wood Appoints Engler New Sales Manager

THE duties of general sales manager of Gifford-Wood Co. have been assumed by Walter G. Engler, a sales engineer of the Gifford-Wood Company for nearly twenty-five years, according to an announcement by Orlan A. Johnson, President. The position has been vacant since the recent death of William E. Herb.

Walter G. Engler

Mr. Engler was born in 1900, and after receiving a degree in Mechanical Engineering in Switzerland, came to this country in his early twenties, working for two other companies before joining Gifford-Wood in 1929. He held a number of sales executive positions in the conveying equipment division of the firm before taking charge of the midwestern territory with offices in Chicago, in 1942. In 1947 he took over management of the company's eastern office in New York.

A member of the American Society of Mechanical Engineers Mr. Engler will make his home in Hudson, N. Y.

CATALOGS AND BULLETINS

Bulletin Describes Picture Window Float Switch

COMPLETE facts on the MS Mojonnier electric float switch for controlling liquid refrigerant level is contained in a new four-page brochure, Bulletin 243 issued by Mojonnier Bros. Co., Chicago. This development features (1) a Pyrex sight glass for observation of ammonia or freon

The Big Book of Refrigeration Knowledge

Basic Refrigeration

PRINCIPLES
PRACTICE
OPERATION

By GUY R. KING
Refrigeration Instructor
Santa Monica Vocational School

THE 29 chapters of this 500-page book contain a complete and simplified presentation of the fundamentals of refrigeration, giving equal treatment to all common refrigerants, design, operation and servicing of the apparatus and systems.

The author has drawn on a wide and varied experience in the practical aspects of refrigeration, coupled with many years of teaching the subject. BASIC REFRIGERATION is written in non-technical language and the author has recognized the requirements of the refrigeration engineer, installer, salesman, student and instructor, compiling the text in a manner which progressively treats the subject from fundamentals to complete systems.

The text is supplemented by an unusually large number of excellent illustrations, (348). All basic points are graphically illustrated in a way that creates additional interest for the reader and assists him to gain a full understanding.

Numerous example problems are given along with a step by step solution. Each chapter is followed by a good group of questions.

$6.00

Reserve your copy today — send check or money order

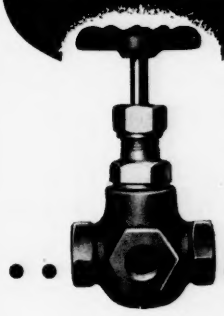
NICKERSON & COLLINS COMPANY
433 N. Waller Ave. CHICAGO 44, ILL.

SHANK **REFRIGERATION PRODUCTS**

TOP CONSTRUCTION!

3-WAY DUAL SHUT-OFF VALVE

For use where Refrigeration Codes require dual relief valve installations. Stainless steel stem. Indicator plate on hand wheel shows position of valve shut off. Completely rust-proofed.



RELIEF VALVES

For Ammonia and Freon. One piece body design—rustproof finish. Internal construction—stainless steel—will not corrode. Positive relief action. Pressures from 75 to 400 lbs.

See your jobber—or write us for prices.

CYRUS SHANK CO.
629 W. Jackson Blvd. Chicago 6, Ill.

CEMCO

Double Gig Ice Hoist
Fast - Sturdy - Dependable -

Send for details

THE CAPITAL ELEVATOR & MFG. CO.
424 W. Town St.
Columbus 8, Ohio

THE INDEX LINE
ICE DEALERS SUPPLIES

Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1951 catalog.

INDEX COUPON AND SUPPLY COMPANY
LA PORTE, INDIANA

level (2) refrigerant liquid level control with sealed float switch for operation under wet or sub-zero conditions (3) an electric switch mechanism housed behind transparent plastic ring for ready observation.

Bulletin on Spray Nozzles

UP-TO-DATE information on non-clogging spray nozzles for cleaning all kinds of materials, screens, fruits, vegetables, etc., is given in a new 4-page illustrated Folder No. 2386 released by Link-Belt Company.

These nozzles consist simply of a scientifically shaped, curved bronze deflector having a smoothly-polished water contact surface and a sharp, true discharge edge—with a U-bolt and two hexagon nuts for holding the deflector in proper position on a pipe drilled with a plain hole at each desired spray location.

Folder shows installation pictures and how simply the nozzle can be applied. Tables give dimensions of nozzles for pipes of 1 to 3 inches diameter, and the capacity in gallons per minute through orifices of 5/32 to ½ inch diameter at pressures of 20 to 100 lbs. per square inch.

A copy of new Link-Belt Folder 2386 will be forwarded to any interested reader upon request.

Link-Belt Bulletin on Spray Nozzles.

Clamp Truck Bulletin

FOOD Machinery Corporation, Packing Equipment Division, Riverside, Calif., has released a new 8 page bulletin picturing and describing its complete line of clamp trucks. FMC clamp trucks are used in warehouses and factories for the moving of boxes, crates, baskets and lugs. The several models in the line, designed for use in various industrial applications, all operate on the same basic principle.

Dairy Type Clamp Truck

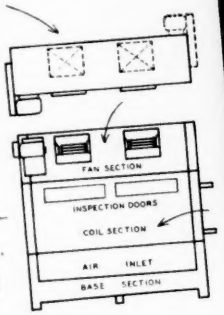
A foot pedal operates the clamp arms which grip the containers, enabling the operator to move them from one place to another with a minimum of time and effort. The bulletin pictures various ways in which FMC Clamp Trucks may be used to facilitate material handling; gives construction details, and pictures other types of hand trucks which have been designed for handling of empty boxes.

Pages from an ENGINEER'S NOTEBOOK

MEMO: Purchasing Dept.

SUBJECT: Acme Industrial Unit Coolers

1. All fabricated steel parts are hot-dip galvanized for longer wear.
2. In the fan section the wheels are galvanized and dynamically balanced; shaft itself is cadmium plated.
3. All bearings are outside the unit—readily accessible for maintenance.
4. Sectional arrangement of units allows great flexibility in installation.
5. The finned coil units come in 4, 6, 8, or 10-row coils—makes it very easy to obtain the proper balance between coil surface and our compressor.



RECOMMEND WE SPECIFY ACME
BWC.

MEN who know always specify Acme

Acme products have always been preferred for their fundamental engineering and modern production methods and design. Since 1919 their name has been a by-word in the heavy refrigeration and air conditioning industry for the latest in design, quality, and performance. Write today for a catalog on any of the items in Acme's complete line.

Address Dept. IR

ACME INDUSTRIES, INC., Jackson, Mich.
AIR CONDITIONING and REFRIGERATION DIVISION

Continuously serving the air conditioning and refrigeration industry since 1919

THE BUYERS DIRECTORY

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 80

ABSORBERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

AIR COMPRESSORS
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Carrier Corp., Syracuse, N. Y.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.

AMMONIA COMPRESSORS
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA CONTROL DEVICES
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.

AMMONIA FLOAT VALVES
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesvoro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA MANUFACTURERS
Armour Ammonia Div., Armour & Co., Chicago, Ill.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bower Chemical Mfg. Co., Henry Philadelphia, Pa.
du Pont, Polychemicals Dept., Wilmington, Delaware

AMMONIA MASKS
Acme Protection Equipment Co., Chicago, Ill.

AMMONIA PURIFIERS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Vilter Mfg. Co., Milwaukee, Wisc.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA RECEIVERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. F., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA VALVES & FITTINGS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesewein & Neuert, Inc. Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

ARCHITECTS AND ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

ASPHALT PRODUCTS
American Bitumuls & Asphalt Co. San Francisco, Calif.

AUTOMATIC CONTROL DEVICES
Alco Valve Co., St. Louis, Mo.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.
Vilter Mfg. Co., Milwaukee, Wis.

BAGS, ICE
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Corp., New York, N. Y.

BAGS, WATERPROOF PAPER
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Co., New York, N. Y.

BEER COOLERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
Frick Co., Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Nickerson & Collins Co., Chicago, Ill.

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Frick Co., Waynesboro, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Roots-Connersville Blower Corp., Connersville, Ky.

BRINE COOLERS
Acme Industries, Inc., Jackson, Mich.
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Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.

CAN DUMPS
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

(Buyers Directory continued on next page)

WATER

FROM THE GROUND BELOW YOU

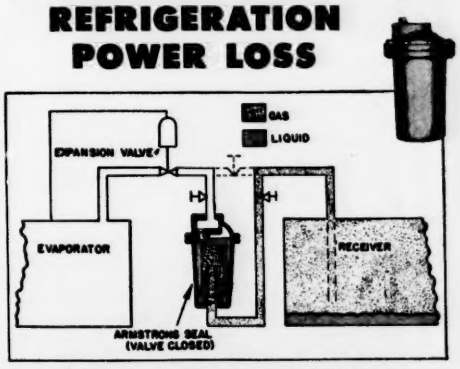
IN single or multiple units, Layne well and pump installations produce tremendous quantities of water at extra low cost. High efficiency designing, precision building and advanced methods of installation make Layne wells and pumps a highly practical and fully justified investment. Layne does the job complete; drills the wells, furnishes all casing, shafting, pumps, motors and sand screen. After complete testing, the system is delivered to you in perfect operating order.

For further information, catalogs and engineering data, address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

Layne WATER SUPPLY WELLS & PUMPS

HERE'S A WAY TO CUT A COMMON SOURCE OF REFRIGERATION POWER LOSS



FAILURE to maintain an adequate liquid seal in the refrigeration receiver permits high pressure gas to blow through to the evaporator. The power used to compress this gas is totally wasted.

An Armstrong inverted bucket refrigerant trap will prevent this loss. It automatically closes against gas, permits the flow of liquid only. Prices and details on request.

Send for Bulletin

ARMSTRONG MACHINE WORKS
860 Maple Street, Three Rivers, Michigan

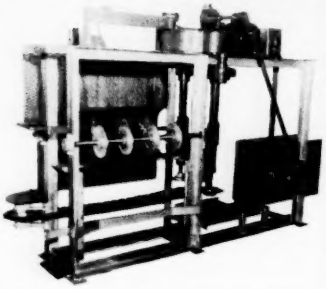
Bateman Scoring Machine with ICE UP-ENDER

LOW COST

Only

$1,595.00

Complete F.O.B. Mineral Wells, Texas



Here's a simple easy - to - operate machine that will give the most for your money . . . years of dependable service. Machine handles 300 lbs. blocks of ice, scoring up to four blocks a minute, and delivering blocks lying down or on end, as desired.

Push button starts machine when ice in elevator, and machine stops automatically when block is scored and ejected. Button must be pushed for each block of ice. Special safety arrangements prevents machine starting before block of ice is in position, even though button is pushed.

All gears are enclosed and working parts are in special grease prepared for cold temperatures. Machine is powered by 3 hp motor, driving with 3 V-belts. All saws are protected by guards. Unit is 78" at highest point, 8 ft. long and 34" from guard to guard.

Bateman

Ice Processing Equipment

MINERAL WELLS, TEXAS

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Tri-Pak Machinery Service Inc., Harlingen, Texas

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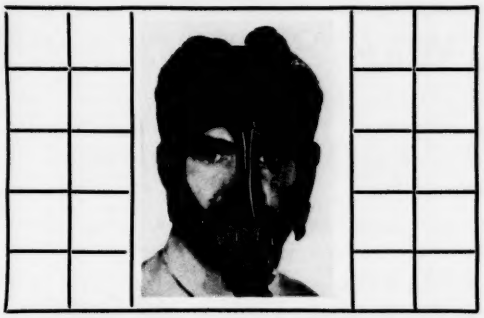

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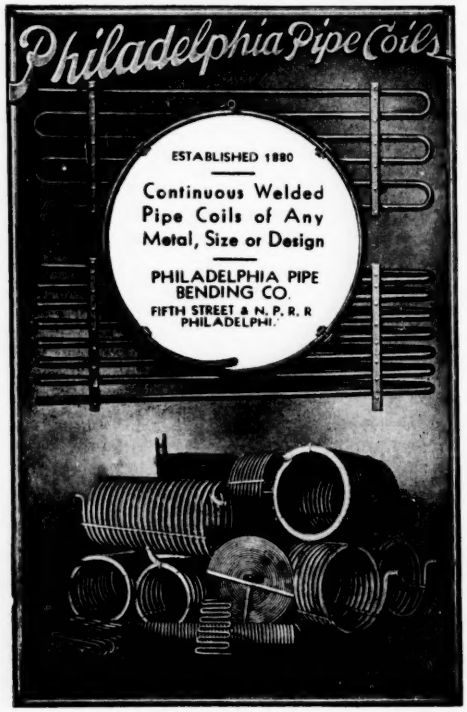
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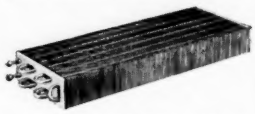

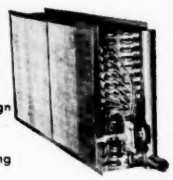

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Item No.

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2—12x12 Frick, direct conn. 150 HP synch. motor 98

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1—8x8 Vertical York, 300 RPM direct connected 327

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1—15-ton electric driven plant 630
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1—*247 Can, 22-ton ice plants, like new* 632A
1—35-38 ton New Clear Ice Making Plants 635
1—150 Ton Multi lift—1622 Can Plant 636
1—702 Can Plant—9 Can Pull 637
1—920 Can Plant—12 Can Pull 638
1—150 Ton Ice Plant—2 Tank 660

Traveling Cranes

2—4 Ton Overhead Traveling Cranes. 9 & 12 Can Grid.

Self-Contained Units

3—4x4 York & Fricks 742
1—5x5 York—390 RPM 743
1—4½x5 Lipman—360 RPM 744
1—3x3 Worthington 748
1—5x5 Frick—Forced Feed—400 RPM Latest Type 758

Used Ice Cubers

1—300 lb. ULINE, fully automatic cuber 501
1—50 lb. F & E Safety Cuber 502

Condensers

3—100 ton shell and tube condensers retubed 919
1—125-ton, Vertical Shell & Tube, 196 2" tubes 921
1—120 ton, 216—2" retubed Vertical Shell & Tube 922
2—20 ton Horizontal—retubed 924

Ice Cans

4000 Cans—Like new—11"x22"x47" 950

ROBERT P. KEHOE MACHINERY CO., Inc.

REFRIGERATION EQUIPMENT

6 EUCKER STREET
RIDGEFIELD PARK, N.J.

PHONE: DIAMOND 2-8554
CABLE ADDRESS: KEHOEINC

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: $4.00 for 50 words or less; 70c for each additional 10 words or fraction thereof; $1 per line for bold face headings; $10.50 per inch for line listings.

POSITIONS AND HELP WANTED

SALESMEN WANTED: Exclusive territories open for representation, calling on ice companies. Top line of food store equipment. Excellent commissions. Address Box JA-7, c/o Ice and Refrigeration.

ENGINEER AND MAINTENANCE MAN WANTED—Young or middle aged man, experienced in commercial direct expansion ammonia and refrigeration. Mechanically minded; to operate and maintain good-sized commercial storage freezer plant in medium-sized city in New England. Fine chance for advancement for the right man who is interested in an orderly plant, well maintained, and reduced cost of operation. Address Box JA-10, c/o Ice and Refrigeration.

POSITION WANTED — As chief refrigeration engineer of a large plant, or group of plants. Can handle all supervision of erection, remodeling, operation and maintenance. Capable of handling labor well; have concentrated on economy. Have over 10 years experience in erection, operation and maintenance of refrigerating equipment for food freezing and storage. Am young man, member of N.A.P.R.E. At present chief refrigeration engineer of large food freezing and cold storage plant. Desire bigger job, or chance for further advancement. References on request. Address Box JA-12, c/o Ice and Refrigeration.

ICE PLANTS—for sale

FOR SALE—Two 40 ton plants and one 15 ton plant. Must be moved. Write P. O. Box 205, Mobile, Ala.

USED EQUIPMENT-wanted & for sale

FOR SALE—York Corp. V.S.A. ammonia compressors; one 7½x6½, one 7½x7½, one 8x8. Also two 7x5 Pennsylvania Pump Co. air compressors. Two 12x10 Union Steam Pump Co. air compressors. All machines with or without motors. Stock of good used ice cans, 300 & 400 lb. sizes. David Gordon, 1502 Indiana Ave., Chicago 5, Ill.

FOR SALE—Several sizes of ammonia and Freon compressors, ice plants, coils, brine coolers, condensers, receivers, oil traps, agitators, Diesel engines. Write us your requirements. Parke Pettegrew & Son Company, 370 West Broad St., Columbus 8, Ohio.

FOR SALE
REBUILT USED EQUIPMENT

2—8x8 Frick ammonia compressors, slow speed.
1—7½x7½ York ammonia compressor, slow speed.
1—6x6 Frick compressor, high speed.
1—6½x6½ York ammonia compressor, slow speed.
1—6x6 York ammonia compressor, slow speed.
1—4x4 York ammonia compressor, slow speed.
1—3x3 Frick self-contained unit.
1—5¾x4" Frick booster compressor.

Address Box DC-2
ICE AND REFRIGERATION

FOR SALE—Used 10x10 and 9x9 Frick ammonia high speed compressors, with or without motors—on shaft 4000 volt motors. North Pole Ice Co., Clarksburg, W. Va.

FOR SALE—1 Vilter compressor 10½x11½ with synchronous motor 150 h.p. installed new in 1948, operated approximately four months each year. Can be inspected and operated at Vigo Ice Company, 120 N. Water St., Terre Haute, Ind.

FOR SALE—To be moved from North Louisiana. One 256 can tank, tank frame and can covers with one Vogt shell brine cooler. 1 condenser, 1 bolted 20 ton Redwood cooling tower with pump & motor. 1 water filter and 1 two-can dump. 1 receiver and accumulator. All equipment installed new in 1948. Used two seasons. Will sell all or part. Contact W. A. Dumas, El Dorado, Arkansas.

FOR SALE—Two 60 ton York evaporative condensers. One 3x3 York self-contained unit. 4x4, 5x5, 8x8, 9x9 York splash lubrication compressors. Two 25 ton shell & tube condensers. Receivers, all sizes. 4 low pressure suspended type blower units. Write Edwin Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE — ICE PLANTS & EQUIPMENT

10, 30, 50 ton Ice Plants.
1—10x10 York ammonia compressor.
1—9x9 York ammonia compressor, direct connected to a 75 h.p. synchronous motor.
1—7½x7½ York with 50 h.p. motor.
2—6½x6½ Yorks.
1—6x6 Frick.
1—5x5 York self-contained unit.
1—5½x5½ Baker.
1—4½x4½ Baker.
3x3 York or Frick self-contained units.
Condensers, brine coolers, cranes, can dumps, fillers, etc. Send us your requirements on any equipment you may need.

B & E REFRIGERATING CO.
2 Orange St., Newark 2, N. J.
Phone MItchell 3-7790 Cable Address "BERECO"

FOR SALE—York 3x3 Refrigeration Machine with Century motor, condenser, gauge, and self-starter attached. Excellent condition. Will sacrifice; $450.00 F.O.B. Altoona. Write W. S. Lee & Sons, 1117 Eighth Ave., Altoona, Pa.

FOR SALE

1—50 ton Frick ice plant, 27 can pull, equipped with evaporative condensers—may be inspected in operation.
1—150 ton York ice plant—13 can pull-equal to new.
1—13x13 York ammonia compressor, direct connected to 150 h.p. synchronous motor.
1—10x10 York ammonia compressor with 100 h.p. motor.
1—8x8 York ammonia compressor, 360 r.p.m. capacity reducing valves, 60 h.p. two speed motor.
1—7½x7½ York ammonia compressor, high speed, forced feed lub., cap. reducing valves—new 1949.
1—Perfection "Special" ice scoring machine, scores and upends.
1—7½ h.p. low pressure blower.
2—Gifford-Wood tiering machines—7 tiers.
Condensers, water pumps, agitators, etc.

JOHN F. CARSON
2829 N. Broad St. Philadelphia 32, Pa.
Phone: BAldwin 9-8549

COLD STORAGE EQUIPMENT

Frick 30"x16'0", 100 ton, 80 tube vertical single pass condenser. Excellent condition, $450.00. Good ammonia valves, both screw and flange types, ½" to 6", at bargains.

SAFEWAY LOCKERS

$25.00 per 5 locker stand (drawer type); $10.00 per 2 locker stand (door type). Lots of other good equipment. Tell us what you need.

AAA STEEL, MCHY. & SUPPLY CO.
Canton & Hawkins Sts. Dallas 1, Texas

FOR SALE—ICE PLANTS & EQUIPMENT

20-50-60-100 Ton Ice Plants—Immediate Sale
Ice Cans—11 x 22 x 47"—Excellent Condition
Ice Cans—11 x 22 x 51"—Excellent Condition
1—York 12½" x 14½" Ammonia Compressor High Speed
1—Frick 12 x 12" Ammonia Compressor direct connected to Diesel Engine — can be purchased without Diesel.
1—York 10 x 10" Ammonia Compressor direct connected to synchronous motor 3/60/440 Speed 300.
1—York 10 x 10" Ammonia Compressor direct connected to 60 H.P. synchronous motor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor direct connected to 100 H.P. synchronous motor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor High Speed.
Parts for York 10 x 10" Cylinder Block, Top Heads, Pistons and connecting rod.
1—York 8 x 8" Ammonia Compressor direct connected to 60 H.P. synchronous motor 360 R.P.M.
1—York 8 x 8" Ammonia Compressor High Speed.
1—York 6 x 6" Ammonia Compressor High Speed.
1—Voss 6 x 6" Ammonia Compressor High Speed.
2—Frick 3 x 3" H.S. Self contained units.
Can supply motors for all compressors.
Low pressure blowers—all sizes.
Assorted sizes electric hoists and cranes ranging from 2 to 6 ton capacity.
2—Gifford & Wood Tiering Machines, 5-tiers.
1—Scoring Machine Perfection.
2—Sheppard Cranes 4 and 5 ton capacities—3 motor jobs.
Brine coolers, submerged shell and tube type.
1½" and 2" Ammonia Coils, approximately 10,000 feet.
Send Us Your Requirements on Any Equipment You May Need.

ENTERPRISE EQUIPMENT CORPORATION
77-79 Alexander Street, Yonkers, New York
Cable: Address: **ENEQCO**
Phone: Yonkers 8-8118-9

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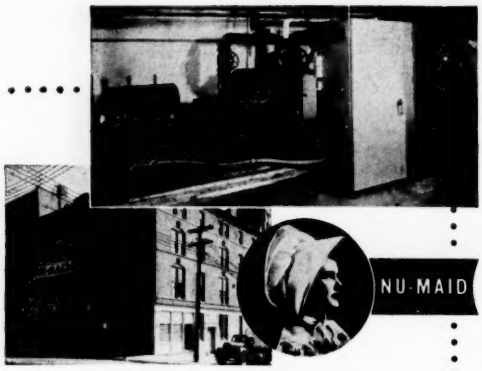
The classified section is the market place of the industry. Get fast action on equipment you want to buy or sell. Buyers are watching for equipment they can use. Convert idle equipment into cash. ICE AND REFRIGERATION classified rates *are low*—results *quick*.



as The Miami Margarine Company expands...

It's VILTER Again—

Refrigeration plays an important part in the processing and storing of Margarine—and The Miami Margarine Company of Cincinnati has known for over twenty years that they can depend on Vilter refrigeration. As demand for their Nu-Maid "Table Grade" Margarine has increased, Miami has been faced with the problem of increasing production in limited available space.

Vilter engineers worked with Miami to plan a consolidation of their refrigeration equipment. The only available space was a relatively small room on the fourth floor, with a bare seven feet of headroom. Direct-connected Vilter VMC compressors proved the solution to the problem. They provided greatly increased capacity with one-half the floor loading of other types of machines, and mounted on cork, produced no objectionable vibration. So successful was the first VMC installation, a second was made a year later. With this Vilter equipment, the refrigeration room will be able to accommodate four times the original estimated capacity.

Food processors—and other users of refrigeration—the country over have found time and time again that the experience of Vilter engineers and the design of Vilter equipment have helped them solve refrigeration problems and save money. More than that, they experience lower costs of operation, less maintenance, and greater freedom from costly "down-time" when they use Vilter refrigeration equipment.

Vilter

Your nearby Vilter Representative or Distributor will be glad to show you how you can save money with Vilter.

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY
MILWAUKEE 7, WISCONSIN

Ammonia and Freon Compressors • Pakicers • Evaporative and Shell & Tube Condensers • Pipe Coils • Valves and Fittings • Air Conditioning

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Wanted and For Sale Advertising 79

We have been asked:

"How would you insulate a cold air duct while a 35° room is under refrigeration?"

We recently received a letter that asked the following question:

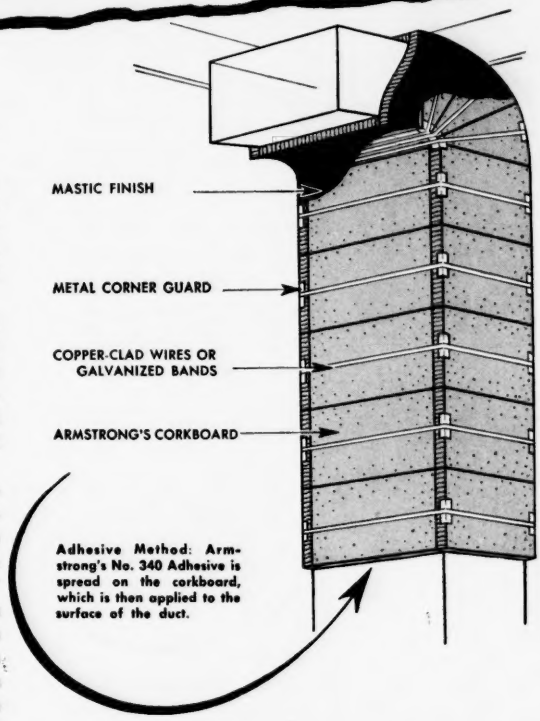
"A duct which runs through one of our 35° storage rooms carries cold air at a temperature below the dew point of the room. We are troubled with condensation on the duct and would like to insulate it without taking the room out of service. How would you insulate and finish this duct?"

To answer this question we sent the specification illustrated at the right. It shows the adhesive method of applying Armstrong's Corkboard to cold air ducts. After the duct has been cleaned, Armstrong's No. 340 Cement is spread on the corkboard with a notched trowel, and the insulation is then applied to the duct.

Because the 35° temperature would stiffen the adhesive and make trowelling difficult, we suggested that it be applied outside the room. The corkboard could then be carried in and secured in place with copper clad wires or metal bands on 12" centers over metal corner guards. For ducts greater than 3' in any one dimension, metal bands should be used. Bands on the bottoms of ducts wider than 6' should be secured to metal fasteners attached to the center of the duct with a suitable adhesive. Sheet metal screws may also be used.

We also suggested, in this case, that the insulation be Armstrong's Mastic-Finish Corkboard. This product has an asphalt mastic finish ironed on at the factory and eliminates the need for applying a finish in the 35° room.

Whenever you're planning an insulation job, contact an Armstrong engineer. He has a thorough understanding of all phases of insulation work, and his practical advice takes into account every individual problem of the job at hand. In addition, Armstrong's Contracting Service will furnish you with top-quality materials and the skilled workmen to apply them properly. Just call your near-by Armstrong office.

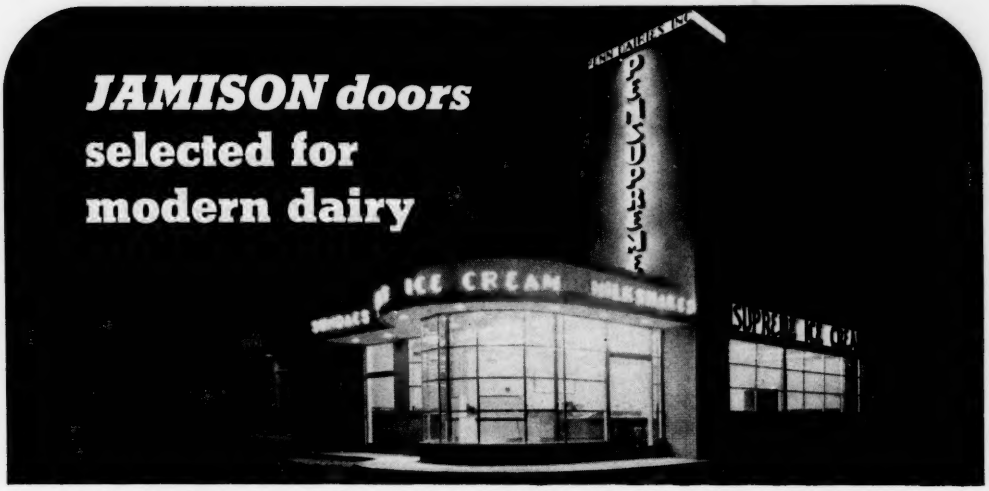

MASTIC FINISH
METAL CORNER GUARD
COPPER-CLAD WIRES OR GALVANIZED BANDS
ARMSTRONG'S CORKBOARD
Adhesive Method: Armstrong's No. 340 Adhesive is spread on the corkboard, which is then applied to the surface of the duct.

SEND US YOUR QUESTIONS. If you have any questions on insulating materials or their use in low-temperature installations, please write us. We'll see that you get a prompt, practical answer. Address your letter or post card to Armstrong Cork Company, 4501 Concord St., Lancaster, Pennsylvania.

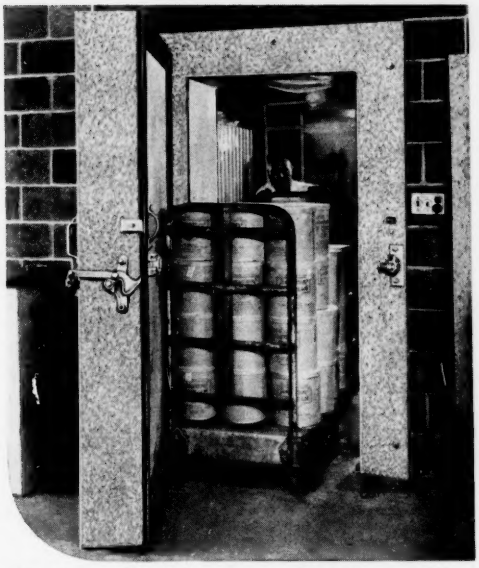
ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS - INSTALLATION

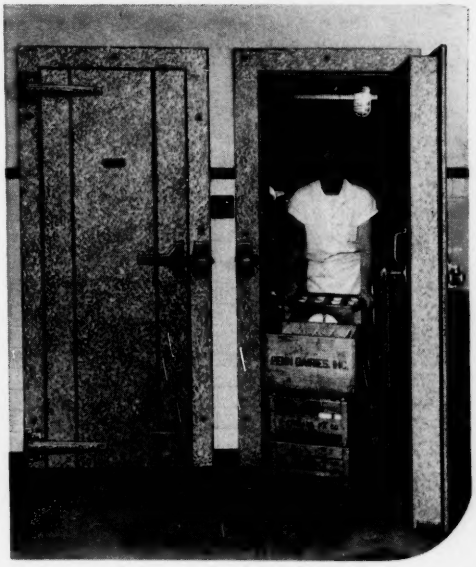
FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.



Drive-In Dairy Restaurant Ice Cream Distributing Depot of Penn Dairies, Inc., Reading, Penna.



Ice Cream Hardening Room with fully metal clad Jamison Super Freezer door.



Kitchen Cooler equipped with two Jamison Standard Doors for easy access. Fully metal clad.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

For specifications and dimensions request Catalog No. 1.
Jamison Cold Storage Door Company, Hagerstown, Maryland, U. S. A.